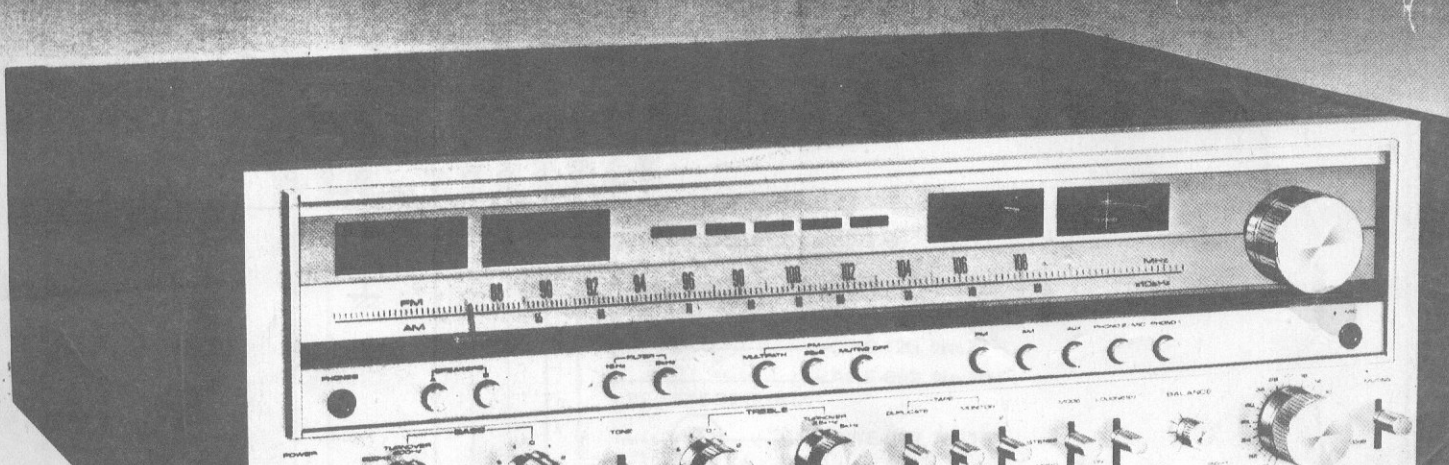
AM/FM STEREO RECEIVER

SX-1080

SERVICE MANUAL


FM
AM
MHz
PIONEER STEREO RECEIVER SX-1080
POWER
BASS
TREBLE
TONE
BALANCE

PIONEER

MODEL SX-1080 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
KC	120V only	Canada model
HG	220V and 240V (Switchable)	Europe or Oceania model
S	110V, 120V, 220V and 240V (Switchable)	General export model
S/G	110V, 120V, 220V and 240V (Switchable)	U.S. Military model

NOTICE:

- This service manual is applicable to the SX-1080/KU.
- The SX-1080/HG, S/G, S, KC service manual is issued as an appendix.

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1. SPECIFICATIONS

Semiconductors

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ICs	8
Transistors	36
Diodes	42

Power Amplifier Section

Continuous power output of 120 watts* per channel, min. at 8 ohms or 150 watts* per channel at 4 ohms from 20 Hertz to 20,000 Hertz with no more than 0.05% total harmonic distortion.

Total Harmonic Distortion (20 Hertz to 20,000 Hertz)	
Continuous Rated Power Output	No more than 0.05%
60 watts per channel power output, 8 ohms	No more than 0.02%
1 watt per channel power output, 8 ohms	No more than 0.02%
Intermodulation Distortion (50 Hertz: 7,000 Hertz = 4:1)	
Continuous Rated Power Output	No more than 0.05%
60 watts per channel power output, 8 ohms	No more than 0.02%
1 watt per channel power output, 8 ohms	No more than 0.02%
Frequency Response	5 Hertz to 100,000 Hertz$^{+0}_{-3}$ dB
Input Sensitivity/Impedance	
POWER AMP IN	1V/50 kilohms
Output	
Speaker	A, B, A+B
Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms)	30
Hum and Noise (IHF, short-circuited, A Network)	100dB

Preamplifier Section

Input (Sensitivity/Impedance)	
PHONO 1, 2	2.5mV/50 kilohms
MIC	7.5mV/50 kilohms
AUX	150mV/50 kilohms
TAPE PLAY 1	150mV/50 kilohms
TAPE PLAY 2	150mV/50 kilohms
PHONO Overload Level (1kHz; T.H.D: 0.05%)	
PHONO 1, 2	200mV
Output Level/Impedance	
TAPE REC 1	150mV
TAPE REC 2	150mV
PRE OUT	1V/1 kilohms
Total Harmonic Distortion (20Hz to 20,000Hz 1V output)	No more than 0.05%
Frequency Response	
PHONO (RIAA equalization)	20Hz to 20,000Hz ±0.2dB
AUX, TAPE PLAY	5Hz to 80,000Hz $^{+0}_{-1}$ dB
Tone Control	
BASS	±7dB/±10dB (100Hz) Turnover Frequency 200Hz/400Hz
TREBLE	±7dB/±10dB (10kHz) Turnover Frequency 5kHz/2.5kHz
Filter	
LOW	15Hz (6dB/oct.)
HIGH	6kHz (6dB/oct.)
Loudness Contour (Volume control set at −40dB position)	+6dB (100Hz) +3dB (10kHz)
Hum and Noise (IHF, short-circuited, A Network)	
PHONO	76dB
AUX, TAPE PLAY	90dB
Muting	−20dB

FM Section

Usable Sensitivity	
MONO	9.8dBf (1.7μV)
50dB Quieting Sensitivity	
MONO	14.2dBf (2.8μV)
STEREO	37dBf (39μV)
Signal to Noise Ratio	
(at 75dBf) . . . STEREO	74dB
(at 65dBf) . . . MONO	80dB
STEREO	71dB
Distortion (at 65dBf)	
100Hz MONO/STEREO	0.1%/0.2%
1kHz MONO/STEREO	0.1%/0.15%
6kHz MONO/STEREO	0.1%/0.2%
Frequency Response	30Hz to 15,000Hz ±0.5dB
Capture Ratio	1.0dB
Alternate Channel Selectivity	80dB
Spurious Response Ratio	100dB
Image Response Ratio	90dB
IF Response Ratio	100dB
AM Suppression Ratio	55dB
Muting Threshold	19.2dBf (5μV)
Stereo Separation	50dB (1kHz), 35dB (30Hz – 15kHz)
Subcarrier Product Ratio	65dB
SCA Rejection Ratio	65dB
Antenna Input	300 ohms balanced 75 ohms unbalanced

AM Section

Sensitivity	(IHF, Ferrite antenna)	300μV/m
	(IHF, Ext. antenna)	15μV
Selectivity		30dB
Signal-to-Noise Ratio		50dB
Image Response Ratio		40dB
IF Response Ratio		40dB
Antenna		Built-in Ferrite Loopstick Antenna

Miscellaneous

Power Requirements		120V 60Hz
Power Consumption		350W (UL), 800W (CSA) 1100W (max.)
Dimensions		526(W) x 176(H) x 440(D) mm 21-11/16(W) x 6-15/16(H) x 17-5/16(D) in
Weight	Without Package	21.3kg (47lb)
	With Package	24.2kg (53lb 6oz)

Furnished Parts

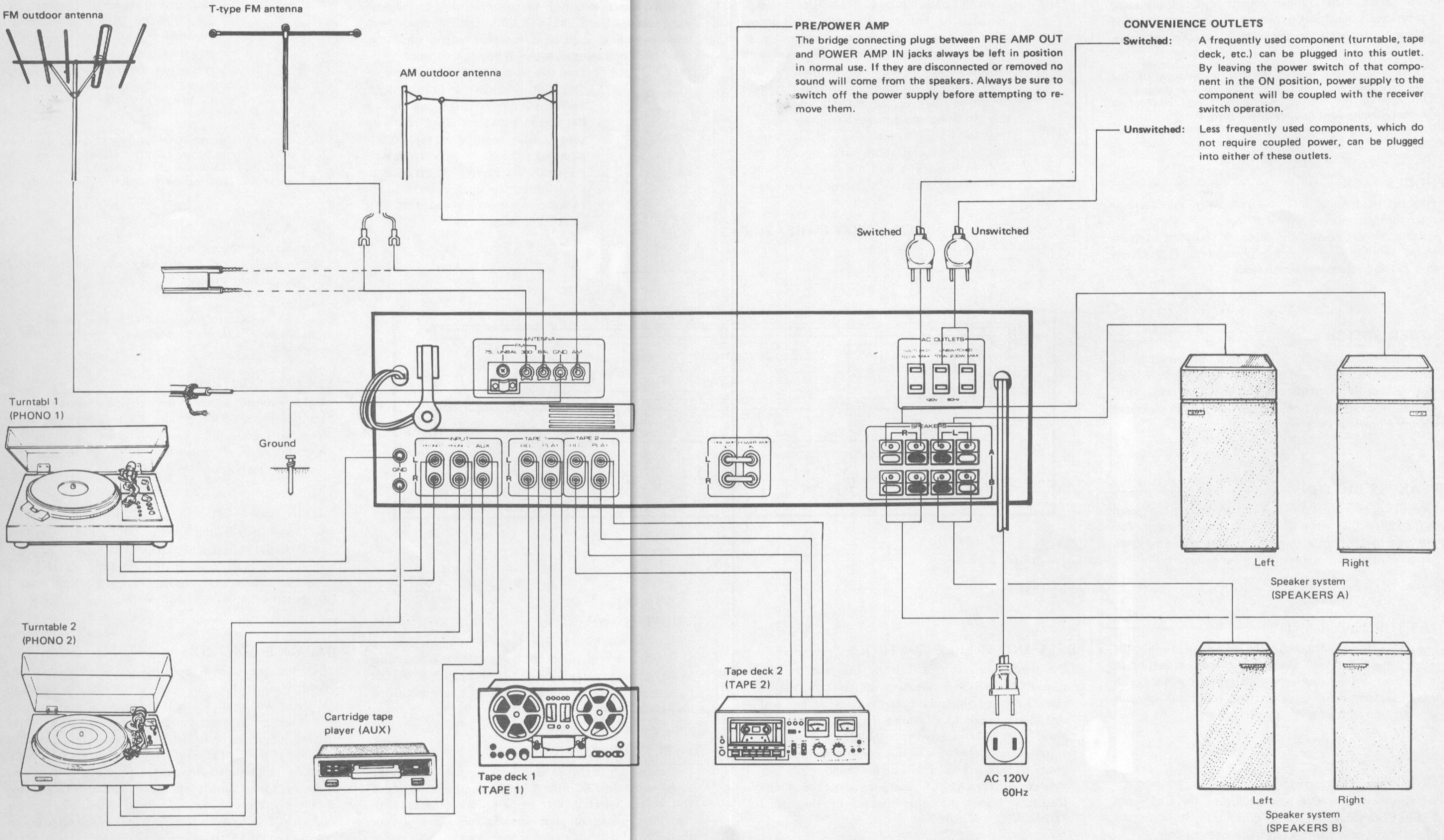
FM T-type Antenna	1
Operating Instructions	1
Hex. Wrench	1

***Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.**

NOTE:

Specifications and the design subject to possible modification without notice due to improvements.

2. CONNECTION DIAGRAM


FM outdoor antenna
T-type FM antenna
AM outdoor antenna
Switched
Unswitched
ANTENNA
FM
75Ω UNBAL
300Ω BAL
GND
AM
AC OUTLETS
UNSWITCHED
TOTAL 200W MAX
120V 60Hz
Turntabl 1
(PHONO 1)
Ground
GND
L
R
INPUT
AUX
TAPE 1
REC
PLAY
TAPE 2
REC
PLAY
SPEAKERS
R
L
A
B
Left
Right
Speaker system
(SPEAKERS A)
Turntable 2
(PHONO 2)
Cartridge tape
player (AUX)
Tape deck 1
(TAPE 1)
Tape deck 2
(TAPE 2)
AC 120V
60Hz
Left
Right
Speaker system
(SPEAKERS B)

PRE/POWER AMP

The bridge connecting plugs between PRE AMP OUT and POWER AMP IN jacks always be left in position in normal use. If they are disconnected or removed no sound will come from the speakers. Always be sure to switch off the power supply before attempting to remove them.

CONVENIENCE OUTLETS

Switched: A frequently used component (turntable, tape deck, etc.) can be plugged into this outlet. By leaving the power switch of that component in the ON position, power supply to the component will be coupled with the receiver switch operation.

Unswitched: Less frequently used components, which do not require coupled power, can be plugged into either of these outlets.

3. FRONT PANEL FACILITIES

POWER METERS

These power meters allow you to read out the rated power level when speakers with a nominal impedance of 8 ohms are connected to the receiver's speaker terminals.

NOTE:
These values are related to the impedance of the speakers and they vary according to the frequency. In order to find out the exact output level, connect an 8-ohm dummy load instead of the speakers.

PHONES JACK

Plug the headphones into this jack when you want to listen through your stereo headphones.
Release the all SPEAKERS buttons if you want to listen to the sound through your headphones only. (This means that all two buttons will be released).

POWER SWITCH

Flip this switch to the ON position to supply power to the stereo receiver. There will be a short delay when it is set to ON, because the muting circuit has been actuated to suppress the unpleasant noise that is sometimes generated when the power is switched on and off.

SPEAKERS BUTTONS

Press the button corresponding to the speakers connected to the SPEAKERS terminals (A, B) on the rear panel. You can press two of these buttons to listen to sound from two pairs of speaker systems at the same time.

BASS TURNOVER SWITCH

Use this switch to change over the frequency in which the sound adjustment with the BASS control is starting to take effect. Select 200Hz or 400Hz in accordance with the characteristics of your listening room and of your speakers, and with your general preference.

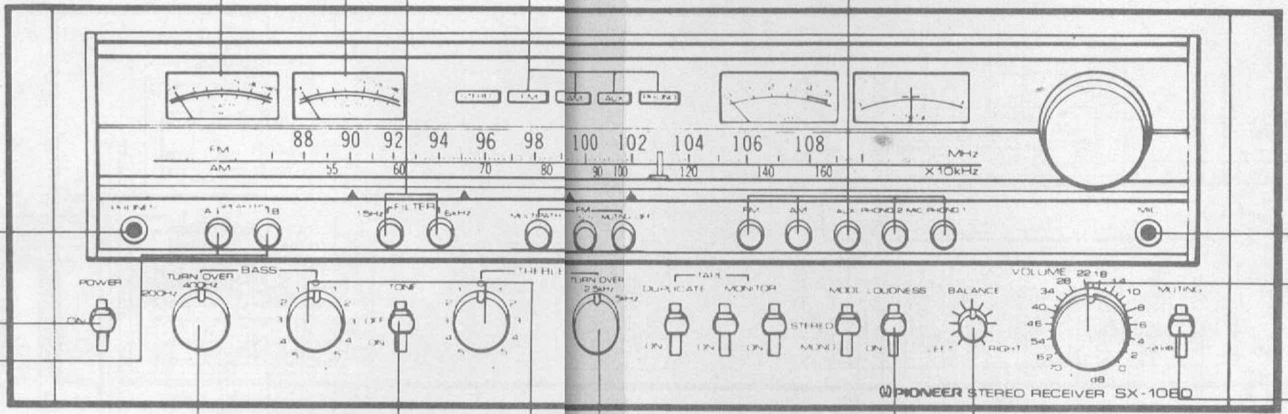
TONE SWITCH

Set this switch to ON when adjusting the BASS and TREBLE controls. In the OFF position, it causes the amplifier to operate with a flat frequency response.

FILTER BUTTONS

15Hz . .	When this button is pressed, a 6dB/oct attenuation can be provided for frequencies below 15Hz. This means that you can cancel out noise in the ultra-low frequencies which is generated by low-pitched rumble from a turntable and other forms of distortion. Although this noise cannot be heard, it can generate intermodulation distortion and damage the speakers.
6kHz . .	Press this button to provide a 6dB/oct attenuation at frequencies above 6kHz. Set it to this position when you find high-frequency noise, such as that from scratched records, unpleasant.

FUNCTION INDICATOR



BASS AND TREBLE CONTROLS

Use these controls to adjust the bass and the treble. If you set the TONE switch to ON and turn the BASS control to the right from its center position, you will be able to emphasize the sound in a frequency range which is lower than that selected by the BASS TURNOVER switch. Conversely, turning this control from the center position to the left will attenuate the sound.
You can use the TREBLE control to adjust the sound in a frequency higher than that selected by the TREBLE TURNOVER switch.

FUNCTION BUTTONS

Press the function button which corresponds to the program source. Turn the VOLUME control down first before selecting a different function button while the sound from one program source is being reproduced.

FM	Press this button for FM broadcasts. The FM STEREO indicators light up when the receiver is tuned into an FM stereo broadcast. The sound is automatically received monophonically during FM monophonic broadcasts.
AM	Press this button for AM broadcasts.
AUX	Press this button when listening to an audio component connected to the AUX input jacks.
PHONO 2/MIC . .	Press this button when playing a record on the turntable connected to the PHONO 2 jacks, or when using a microphone which you have plugged into the MIC jack.
PHONO 1	Press this button when playing a record on the turntable connected to the PHONO 1 jacks.

NOTES:
1. *Unplug the microphone from the MIC jack when you do not intend to use the microphone otherwise you will not be able to use the PHONO 2 jacks.*
2. *Only one function button should be pressed at a time.*

LOUDNESS SWITCH

Set this switch to ON when listening at a low volume. The frequency response of the human ear varies according to the listening volume, and setting this switch to the ON position compensates for hearing response by emphasizing the bass and treble.

TREBLE TURNOVER SWITCH

Use this switch to change over the frequency in which the sound adjustment with the TREBLE control is starting to take effect. Select 2.5kHz or 5kHz in accordance with the characteristics of your listening room and of your speakers, and with your general preference.

MIC JACK

Plug your microphone into this jack.
The microphone signals are reproduced in mono through the left and right speakers.

NOTE:
A high impedance (approx. 50 kilohms) dynamic type microphone with a standard plug can be connected to this jack.

VOLUME CONTROL

Use this control to adjust the output level to the speakers and headphones. Turn it clockwise to increase the output level. No sound will be heard if you set it to ∞. The scale is graduated in dB which indicate the attenuation when the maximum output level is 0dB.

MUTING SWITCH

Set this switch to the −20dB position to attenuate the audio output indicated by the VOLUME control by 20dB. There is no need to adjust the VOLUME control if you use this switch when turning down the audio output temporarily and when changing over records or tapes.

BALANCE CONTROL

Use this control to balance the volume of the left and right channels. First, however, set the MODE switch to MONO, and adjust so that the sound appears to come from somewhere exactly between the two speakers. If the sound appears to be louder on the right, it means that the volume of the right channel is higher. Turn the BALANCE control to the left and adjust. Conversely, if the sound appears to be louder on the left, it means that the volume of the left channel is higher. Therefore, turn the BALANCE control to the right and adjust. After adjusting, return the MODE switch to STEREO.

FM MUTING BUTTON

ON (released position)	Release this button to suppress unpleasant inter-station noise when tuning in to FM stations.
OFF (depressed position) .	Depress this button to pick up weak stations.

FM 25μS BUTTON

Press this button when listening to a Dolby* FM broadcast; otherwise keep this button at the released position.

FM MULTIPATH BUTTON

Use this switch to detect multipath sound when installing the FM antenna in a position which yields the minimum multipath interference.

TUNING KNOB

Use this to tune in to broadcasting stations.
Select the station and tune for optimum reception by observing the SIGNAL meter for AM stations and both the SIGNAL and TUNING meters for FM stations.

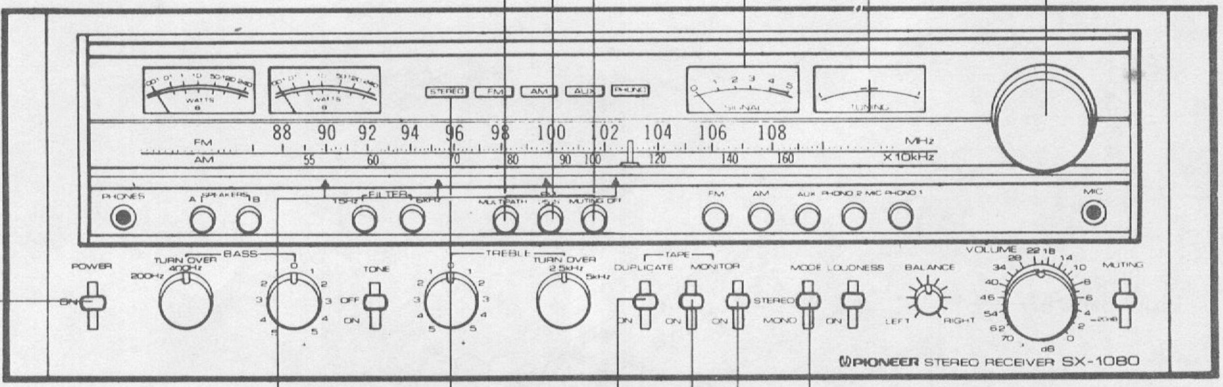
SIGNAL METER

When tuning in to an AM or FM station, the optimum reception position is indicated by the maximum deflection of the meter pointer to the right.

TUNING METER

When tuning in an FM station, the optimum reception position is indicated when the meter pointer deflects to dead center. Check that the SIGNAL meter pointer has deflected as far to the right as possible.

POWER SWITCH


WATTS
STEREO
FM
AM
AUX
PHONO
SIGNAL
TUNING
88 90 92 94 96 98 100 102 104 106 108
MHz
55 60 70 80 90 100 120 140 160
X 10kHz
PHONES
SPEAKERS
A
B
FILTER
15Hz
8kHz
MULTIPATH
25μS
MUTING OFF
FM
AM
AUX
PHONO 2
MIC
PHONO 1
MIC
POWER
ON
BASS
TURN OVER
200Hz
400Hz
TONE
OFF
ON
TREBLE
TURN OVER
2.5kHz
5kHz
TAPE
DUPLICATE
MONITOR
ON
ON
ON
MODE
STEREO
MONO
LOUDNESS
ON
BALANCE
LEFT
RIGHT
VOLUME
dB
MUTING
−20dB
PIONEER STEREO RECEIVER SX-1080

MEMORY MARKERS

These are very convenient for frequent tuning in to the same broadcasting station.

STEREO INDICATOR

This indicator lights up when the receiver is tuned to receive a stereo broadcast.

TAPE MONITOR SWITCHES (1, 2)

Set switch 1 to ON with a tape deck which is connected to the TAPE 1 jacks (REC and PLAY) when you want to monitor the playback or recording of a tape. The tape on a deck which is connected to the TAPE 2 jacks (REC and PLAY) can be similarly monitored by setting switch 2 to ON.

NOTE:

Set these switches to the upper (off) position when listening to records or the broadcast.

MODE SWITCH

Use this switch for selecting mono or stereo performances.

STEREO:	Set to this position for normal stereo operation.
MONO:	When set to this position, the left and right channel signals will be mixed and reproduced monophonically from both speaker systems.

TAPE DUPLICATE SWITCH

Set this switch to ON when you want to duplicate or edit a pre-recorded tape using two tape decks.

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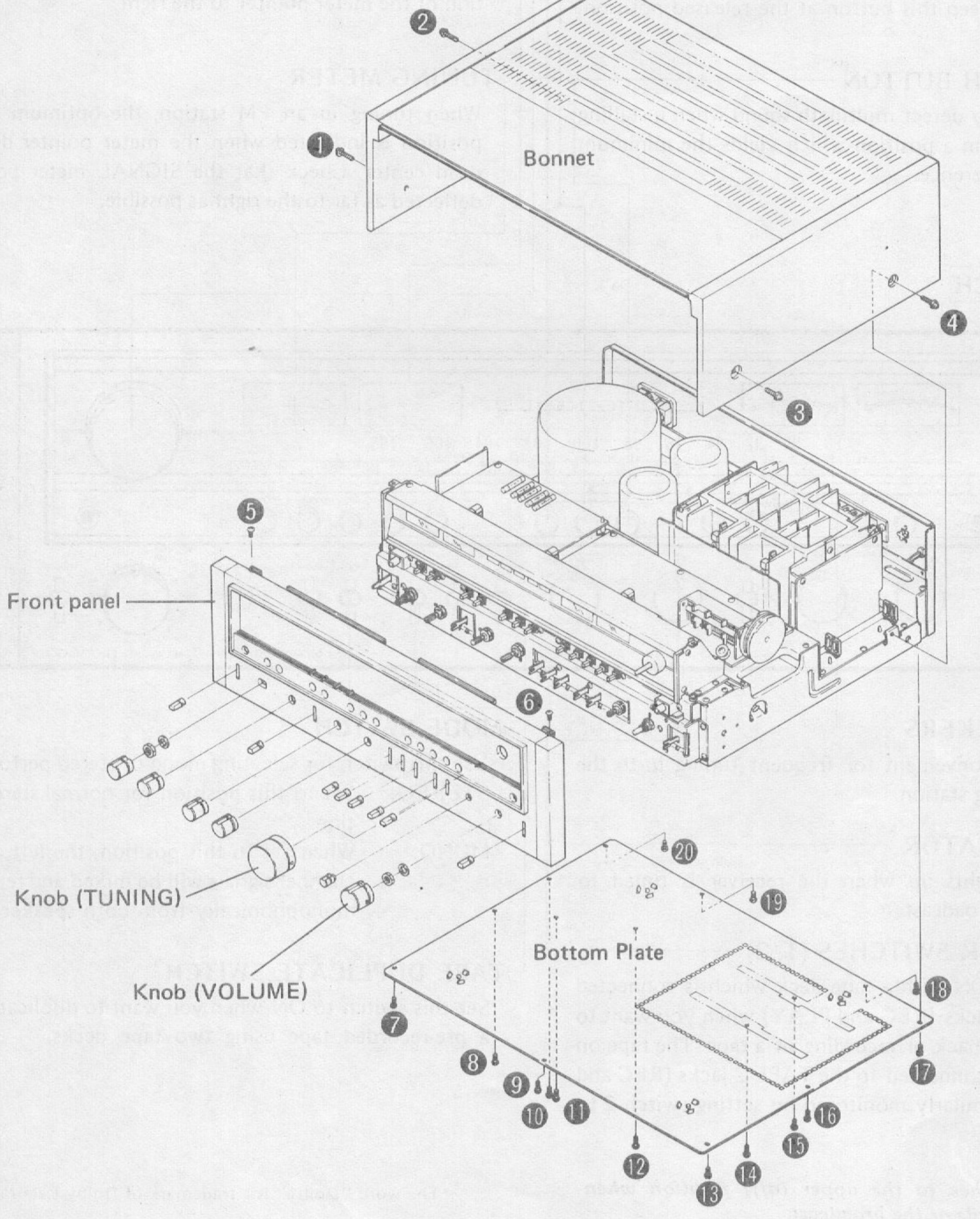
*The word "Dolby" is a trademark of Dolby Laboratories Inc.

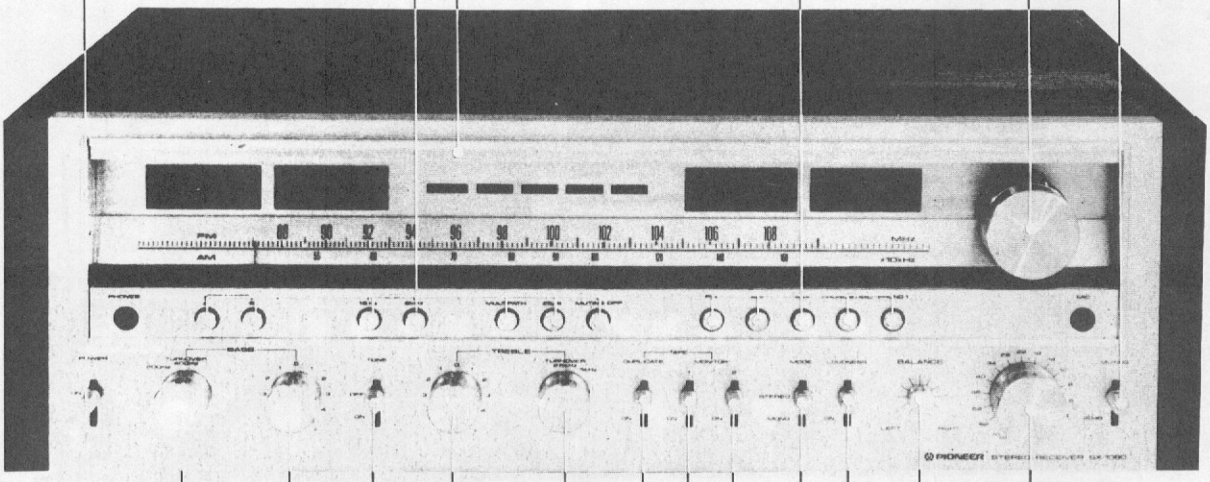
4. DISASSEMBLY

1. Remove screws ① ~ ④ and remove the bonnet.
2. Remove screws ⑤ ~ ⑥, all the knobs, and remove the two nuts and two washers at the front panel. (However, loosen the set screws with the accessory allen wrench before attempting to remove the TUNING and VOLUME knobs.)
3. Remove screws ⑦ ~ ⑳ and remove the bottom plate.


②
①
Bonnet
④
③
⑤
Front panel
⑥
Knob (TUNING)
Knob (VOLUME)
⑳
⑲
Bottom Plate
⑱
⑦
⑧
⑨
⑩
⑪
⑰
⑯
⑮
⑫
⑭
⑬

5. PARTS LOCATION

5.1 FRONT PANEL VIEW


FM
AM
88
90
92
94
96
98
100
102
104
106
108
MHz
BASS
TREBLE
BALANCE
PIONEER STEREO RECEIVER SX-1080

Front panel assembly
ANB-543

Push knob (SPEAKERS, FILTER, FM)
AAD-140

Lever knob assembly (POWER)
AAD-139

Push knob (FM, AM, AUX, PHONO 2
MIC, PHONO 1)
AAD-140

Knob (TUNING)
AAA-047

Lever knob (MUTING)
AAD-138

Knob (BASS)
AAB-175

Lever knob (TONE)
AAD-138

Knob (TREBLE)
AAB-175

Knob (VOLUME)
AAB-174

Knob (BALANCE)
AAB-176

Lever knob (DUPLICATE, MONITOR 1, 2,
MODE, LOUDNESS)
AAD-138

5.2 FRONT VIEW WITH FRONT PANEL REMOVED

Power meter
AAW-074

Push switch (FILTER, FM)
ASG-128

Double meter
AAW-075

Push switch (FM, AM, AUX, PHONO 2/MIC, PHONO 1)
ASG-126

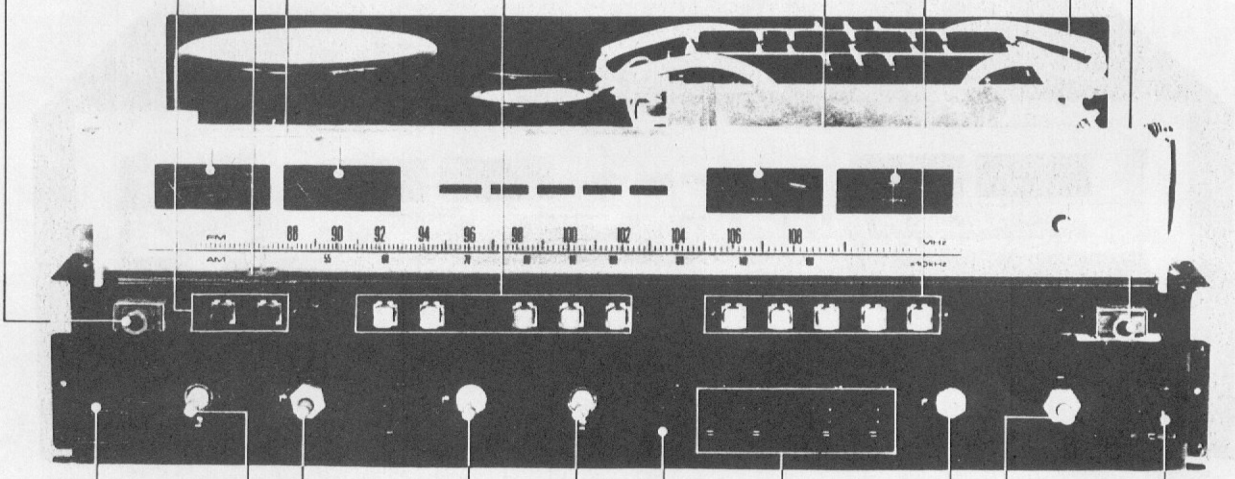
Dial pointer assembly
AAF-065

Push switch (SPEAKERS)
ASG-133

Headphones jack
AKN-010

Dial shaft assembly
AXA-180

MIC jack
AKN-012



Lever switch (POWER)
ASK-080

Rotary slide switch (TURNOVER)
ASE-105

Variable resistor (BASS, TREBLE)
ACV-136

Rotary slide switch (TURNOVER)
ASE-106

Lever switch (DUPLICATE)
ASK-145

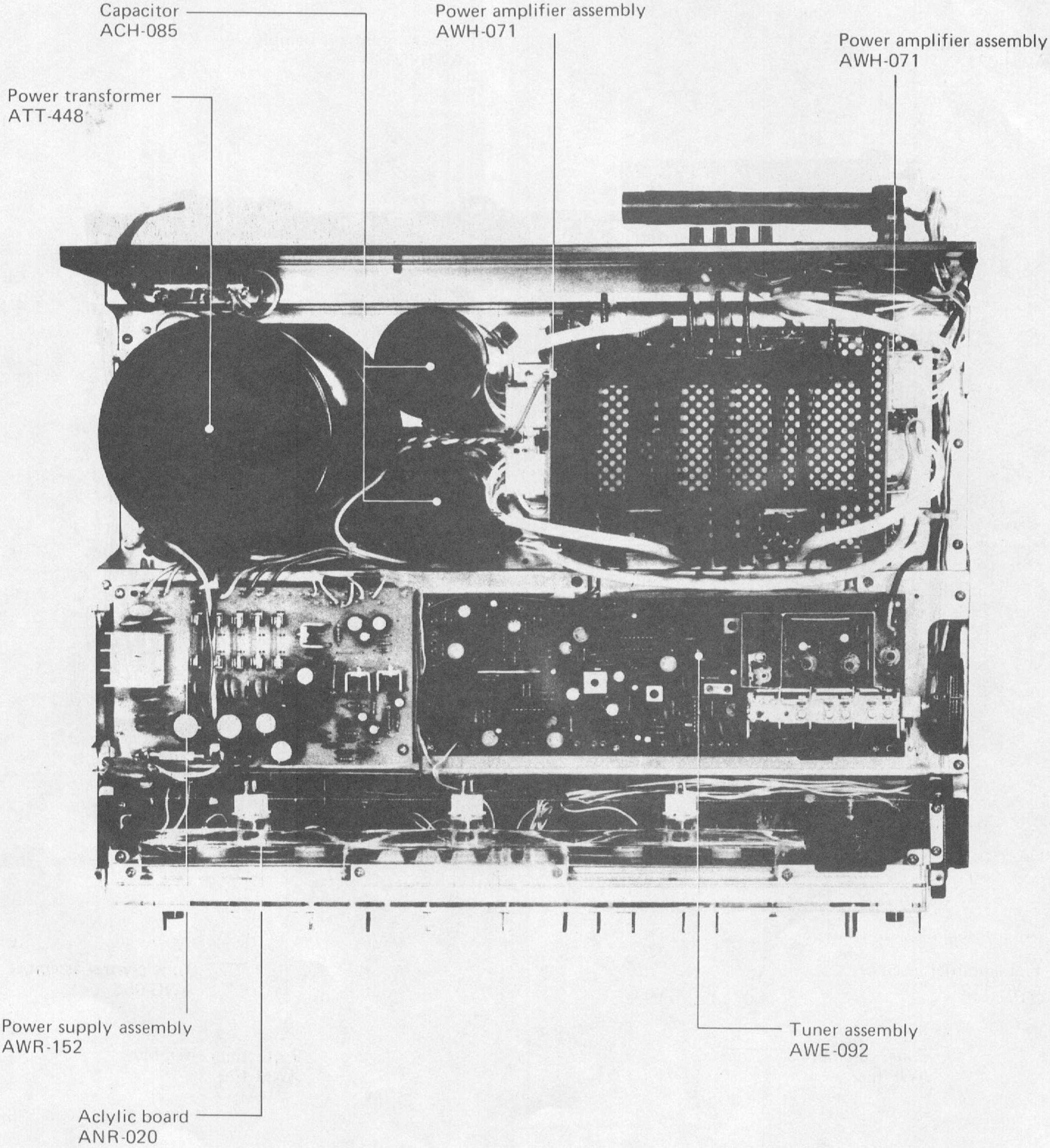
Lever switch (MUTING)
ASK-144

Variable resistor (VOLUME)
ACV-162

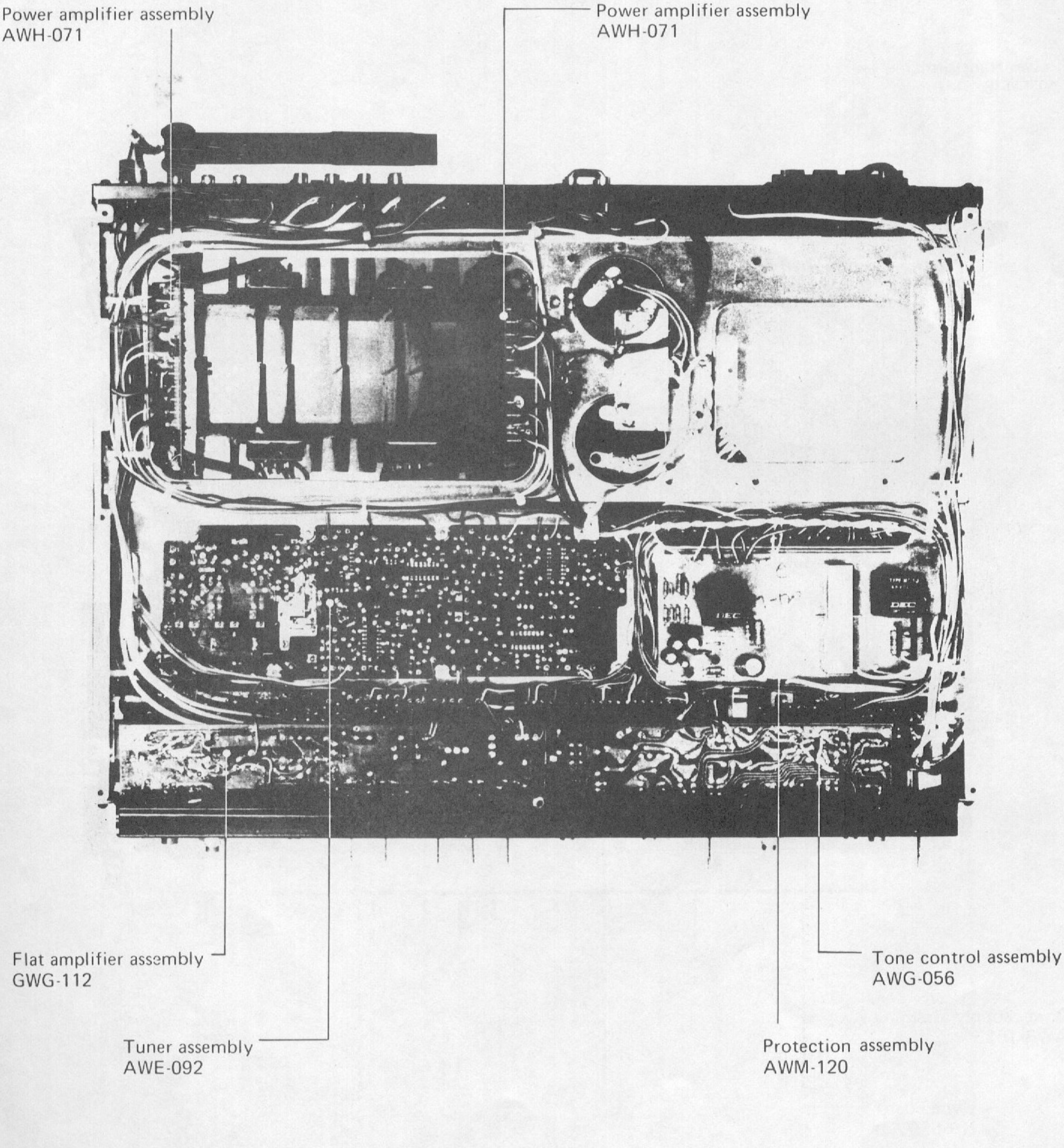
Variable resistor (BALANCE)
ACV-190

Lever switch (TAPE, MODE, LOUDNESS)
ASK-144

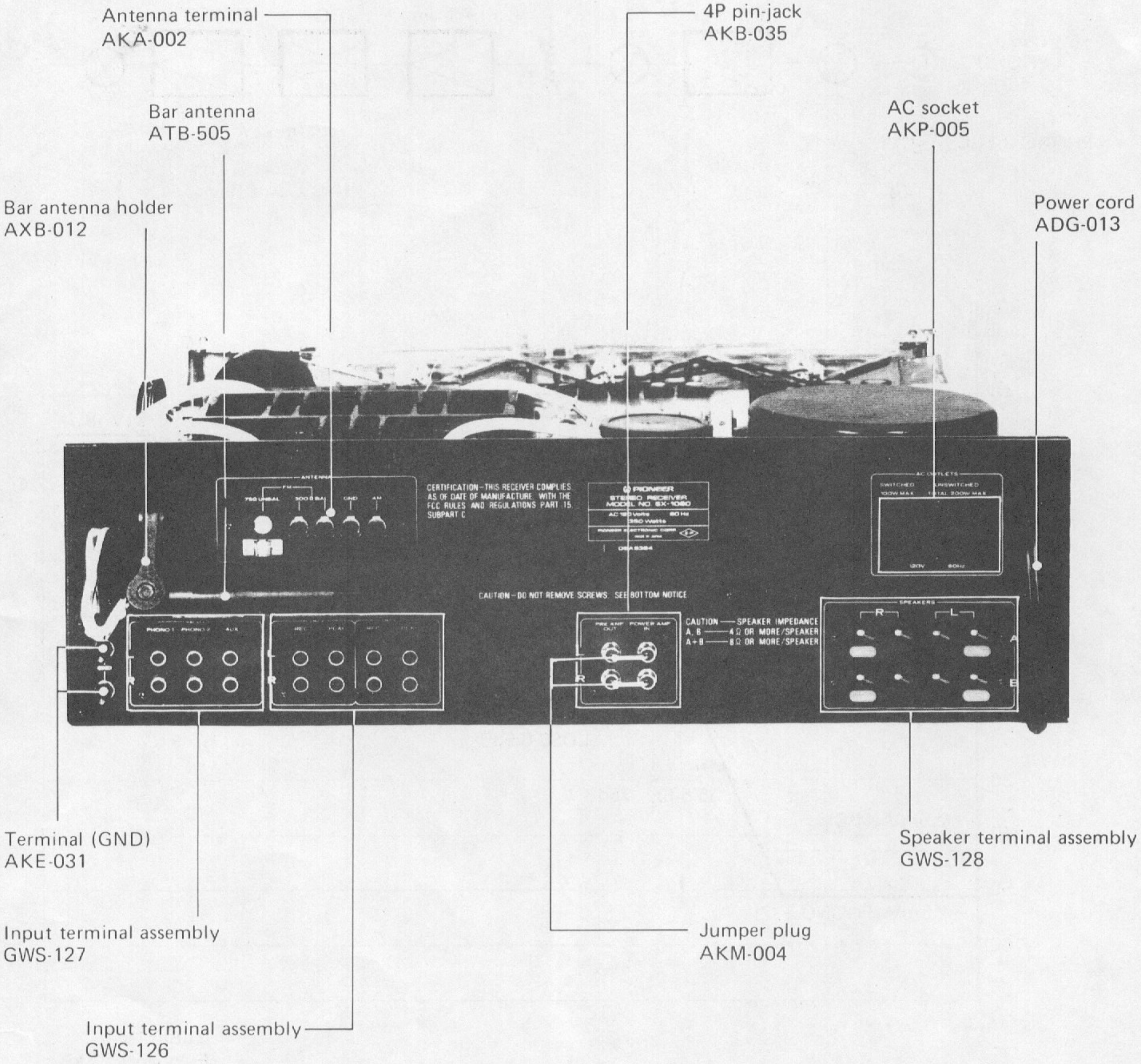
5.3 TOP VIEW WITH BONNET REMOVED


Capacitor
ACH-085
Power amplifier assembly
AWH-071
Power amplifier assembly
AWH-071
Power transformer
ATT-448
Power supply assembly
AWR-152
Tuner assembly
AWE-092
Aclylic board
ANR-020

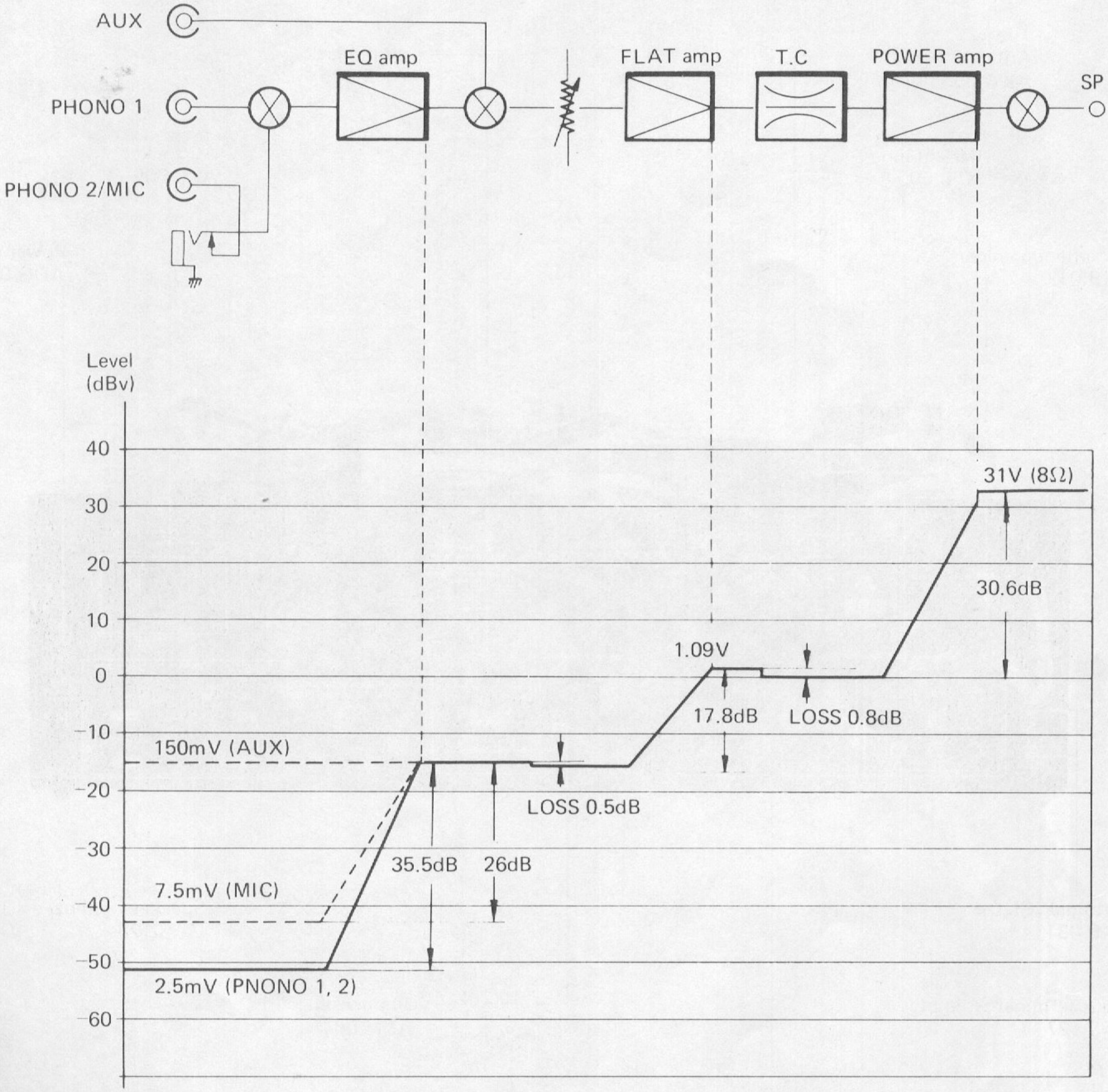
5.4 BOTTOM VIEW WITH BOTTOM PLATE REMOVED


Power amplifier assembly
AWH-071
Power amplifier assembly
AWH-071
Flat amplifier assembly
GWG-112
Tuner assembly
AWE-092
Tone control assembly
AWG-056
Protection assembly
AWM-120

5.5 REAR PANEL VIEW

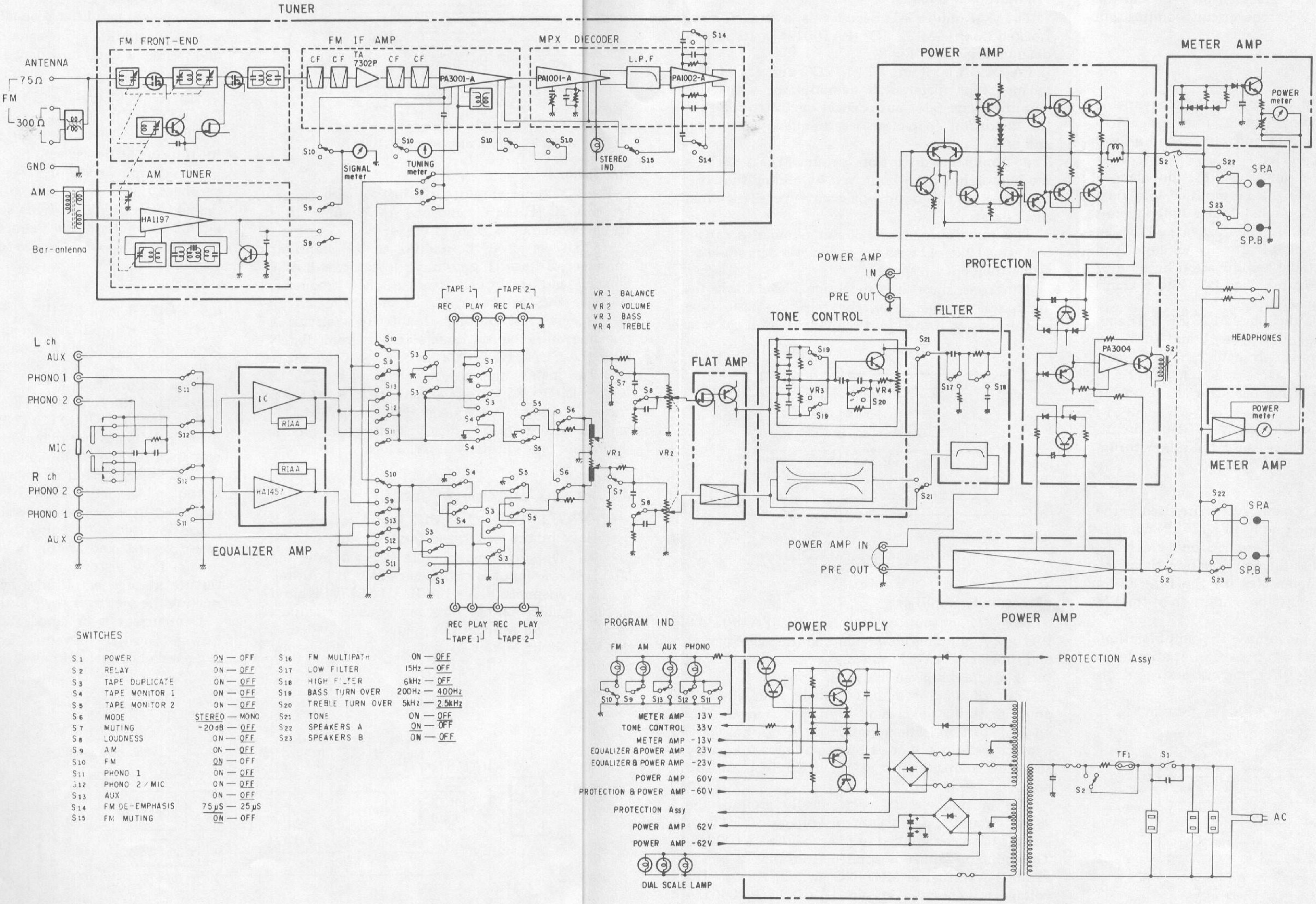

Antenna terminal
AKA-002
Bar antenna
ATB-505
Bar antenna holder
AXB-012
4P pin-jack
AKB-035
AC socket
AKP-005
Power cord
ADG-013
ANTENNA
FM
75Ω UNBAL
300Ω BAL
GND
AM
CERTIFICATION—THIS RECEIVER COMPLIES AS OF DATE OF MANUFACTURE WITH THE FCC RULES AND REGULATIONS PART 15 SUBPART C
PIONEER
STEREO RECEIVER
MODEL NO. SX-1080
AC 120 Volts 60 Hz
350 Watts
PIONEER ELECTRONIC CORP.
MADE IN JAPAN
AC OUTLETS
SWITCHED
UNSWITCHED
100W MAX
TOTAL 200W MAX
120V 60Hz
CAUTION—DO NOT REMOVE SCREWS. SEE BOTTOM NOTICE
PHONO 1
PHONO 2
AUX
L
R
PRE AMP OUT
POWER AMP IN
CAUTION —SPEAKER IMPEDANCE
A, B —4Ω OR MORE/SPEAKER
A+B —8Ω OR MORE/SPEAKER
SPEAKERS
R
L
A
B
Terminal (GND)
AKE-031
Speaker terminal assembly
GWS-128
Input terminal assembly
GWS-127
Jumper plug
AKM-004
Input terminal assembly
GWS-126

6. LEVEL DIAGRAM


AUX
PHONO 1
PHONO 2/MIC
EQ amp
FLAT amp
T.C
POWER amp
SP
Level
(dBv)
40
30
20
10
0
−10
−20
−30
−40
−50
−60
31V (8Ω)
30.6dB
1.09V
17.8dB
LOSS 0.8dB
150mV (AUX)
LOSS 0.5dB
35.5dB
26dB
7.5mV (MIC)
2.5mV (PNONO 1, 2)

0 dBv=1V
Frequency: 1 kHz

7. BLOCK DIAGRAM


TUNER
FM FRONT-END
FM IF AMP
CF
TA 7302P
PA3001-A
MPX DECODER
PA1001-A
L.P.F
PA1002-A
S14
S15
STEREO IND
SIGNAL meter
TUNING meter
S10
S9
ANTENNA
FM
75Ω
300Ω
GND
AM
Bar-antenna
AM TUNER
HA1197
L ch
AUX
PHONO 1
PHONO 2
MIC
R ch
PHONO 2
PHONO 1
AUX
S11
S12
S13
IC
RIAA
HA1457
EQUALIZER AMP
TAPE 1
TAPE 2
REC
PLAY
S3
S4
S5
S6
S7
S8
VR 1 BALANCE
VR 2 VOLUME
VR 3 BASS
VR 4 TREBLE
VR1
VR2
FLAT AMP
TONE CONTROL
S19
S20
VR3
VR4
S21
FILTER
S17
S18
POWER AMP IN
PRE OUT
POWER AMP
PROTECTION
PA3004
S2
METER AMP
POWER meter
S22
S23
SP.A
SP.B
HEADPHONES
PROGRAM IND
FM
AM
AUX
PHONO
POWER SUPPLY
PROTECTION Assy
METER AMP 13V
TONE CONTROL 33V
METER AMP -13V
EQUALIZER & POWER AMP 23V
EQUALIZER & POWER AMP -23V
POWER AMP 60V
PROTECTION & POWER AMP -60V
PROTECTION Assy
POWER AMP 62V
POWER AMP -62V
DIAL SCALE LAMP
TF1
S1
AC

SWITCHES

S1	POWER	ON — OFF	S16	FM MULTIPATH	ON — OFF
S2	RELAY	ON — OFF	S17	LOW FILTER	15Hz — OFF
S3	TAPE DUPLICATE	ON — OFF	S18	HIGH FILTER	6kHz — OFF
S4	TAPE MONITOR 1	ON — OFF	S19	BASS TURN OVER	200Hz — 400Hz
S5	TAPE MONITOR 2	ON — OFF	S20	TREBLE TURN OVER	5kHz — 2.5kHz
S6	MODE	STEREO — MONO	S21	TONE	ON — OFF
S7	MUTING	-20dB — OFF	S22	SPEAKERS A	ON — OFF
S8	LOUDNESS	ON — OFF	S23	SPEAKERS B	ON — OFF
S9	AM	ON — OFF			
S10	FM	ON — OFF			
S11	PHONO 1	ON — OFF			
S12	PHONO 2 / MIC	ON — OFF			
S13	AUX	ON — OFF			
S14	FM DE-EMPHASIS	75µS — 25µS			
S15	FM MUTING	ON — OFF			

8. CIRCUIT DESCRIPTIONS

Refer to the block diagram on page 17 and the schematic on page 37 for the circuit composition of this unit.

8.1 FM TUNER

FM Front end

The FM front end employs a 4-stage variable capacitor in the tuning circuit, dual gate MOS FETs at the RF amplifier and mixer, and a local oscillator with J-FET buffer.

The FM front-end input is 75Ω unbalanced single-tuned circuit. The RF amplifier is a dual gate MOS FET. An M-coupled double-tuned circuit is inserted between stages. The dual gate FET is an amplifying element suitable for RF circuits, and features extremely stable amplification because of its low NF (Noise Figure), high PG (Power Gain) and low feedback capacitance.

The mixer is also a dual gate MOS FET. The reception signal is applied to gate 1 and the local oscillator signal is applied to gate 2. This ciurcuit has low local oscillator signal injection power and the strong reception signal has little effect on the local oscillator.

The local oscillator is a modified Clapp circuit. Its output signal is injected into the mixer thru a J-FET buffer.

IF Amplifier

Four dual element ceramic filters are used as the selection elements, and one IC (TA7302P) containing two differential amplifiers and one FM IF IC (PA3001-A) are used as the amplification elements.

The TA7302P compensates for the filter insertion loss, and also limits the amplitude of the FM signal.

The PA3001-A performs IF amplification, amplitude limiting and FM detection. It also drives the TUNING and SIGNAL meters and controls muting.

The block diagram of the PA3001 is given in Fig. 1.

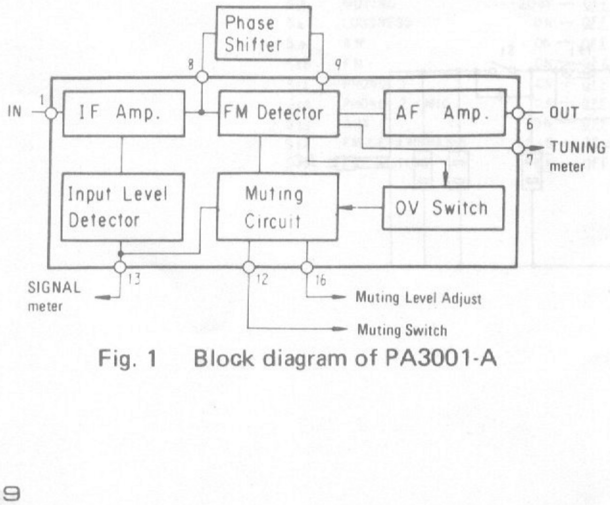


Fig. 1 Block diagram of PA3001-A

FM Multiplex Decoder

The FM multiplex decoder is a PLL (Phase-Locked-Loop) MPX IC (PA1001-A). Its block diagram is given in Fig. 2.

PA1001-A contains a PLL VCO circuit, double-balance type differential demodulator with NFB amplifier, and pilot auto-cancel circuit to improve the distortion characteristics, frequency response, and S/N.

The nonlinear distortion produced at the demodulator has been improved by adding the NFB amplifier to the double-balance type differential demodulator.

The pilot auto-cancel circuit eliminates carrier leakage (19kHz), without a loss of demodulated signal frequency response.

Moreover, since the cancel signal level tracks the inpup pilot signal level, the rejection ratio does not drop even if the input pilot signal level changes.

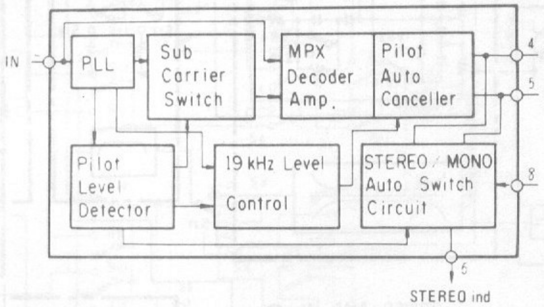


Fig. 2 Block diagram of PA1001-A

FM Output Amplifier

The FM output amp is an IC (PA1002-A). PA1002-A contains an AF amp, muting gate circuit and power ON/OFF muting control circuit. Its block diagram is given in Fig. 3.

The AF amp is a differentially coupled NFB amp featuring excellent dynamic range, S/N and distortion characteristics. A de-emphasis characteristic is obtained by providing a frequency selection characteristic at the NFB loop of this amp.

The muting circuit electronically grounds the signal circuit when a control voltage of 1.4V or greater has been applied to pin 8 of the PA1002-A. This control voltage is applied from pin 12 of the PA3001-A thru the MUTING switch. A 1.4V DC voltage is generated at pin 12 of the PA3001-A when de-tuned more than ±70kHz and at weak inputs (antenna input conversion 5μV or less).

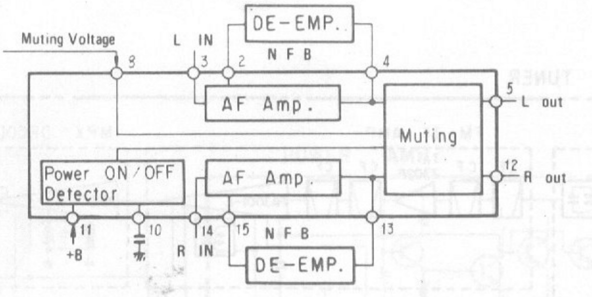


Fig. 3 Block diagram of PA1002-A

AM Tuner

The AM tuner employs a 2-stage variable capacitor, one IC (HA1197) and one AM ceramic filter. Its block diagram is given in Fig. 4.

HA1197 is an IC containing an RF amplifier, converter, 2-stage IF amplifier, detector, and AGC circuit, and features excellent AF frequency response and distortion. Q_1 of the output circuit is a special AM muting circuit. This circuit is operated until the AM tuner stabilizes immediately after the FUNCTION AM switch has been set to ON. The instant the AM switch is set to ON, +B is supplied to R_8, thru C_9, and the base of Q_1 is forward biased. Consequently, Q_1 is turned ON, and the AM output signal is shorted to ground during the time constant of C_9, R_8.

8.2 PHONO, MIC INPUT CIRCUIT

PHONO 1, PHONO 2/MIC input switching is performed by the switch and the MIC jack.

When a microphone plug is inserted into the MIC jack, the input is switched to MIC at both the L and R channels. Since the IC (HA1457) is used as both a microphone amp and equalizer amp, a circuit having a reverse RIAA curve is provided at the MIC input circuit to obtain a flat frequency response.

8.3 FLAT AMPLIFIER

The power amplifier is an all-stage direct-coupled circuit. It amplifies the signal to the required level and sends a low impedance signal to the tone control circuit.

8.4 TONE CONTROL

The tone control circuit is an NFB type inserted in front of the power amp.

Bass turnover (200Hz ←→ 400Hz) and treble turnover (2.5kHz ←→ 5kHz) switches and a tone defeat circuit which bypasses the tone control circuit to obtain a flat characteristic are provided, in addition to variable resistor which adjusts the rise and fall.

8.5 POWER AMPLIFIER

The power amplifier is an all-stage direct-coupled pure complementary OCL circuit having a differential amplifier at the first stage, current mirror circuit at the predriver stage and a parallel push-pull amplifier at the final stage (Fig.5).

The first stage (Q_1) is a PNP type dual transistor differential amplifier that amplifies the input signal and stablizes the center voltage of the power stage. Q_3 and Q_4 are driven by the opposite phases of the output of Q_1. The output of Q_4 is applied to the current mirror circuit consisting of D_2 and Q_5 and phase inverted. Consequently, Q_3 and Q_5 are in-phase signals, and are operated as a push-pull predriver. Low distortion and improved rise characteristic at high amplitudes have been realized by making the predriver stage push-pull.

Overcurrent is detected and destruction of the power transistor prevented by Q_8. The final stage is a parallel connected power amplifier.

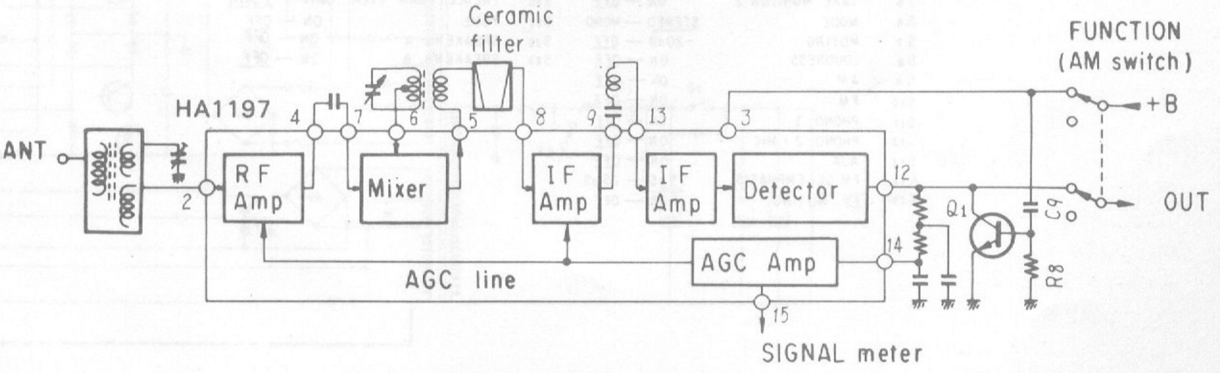


Fig. 4 Block diagram of AM tuner

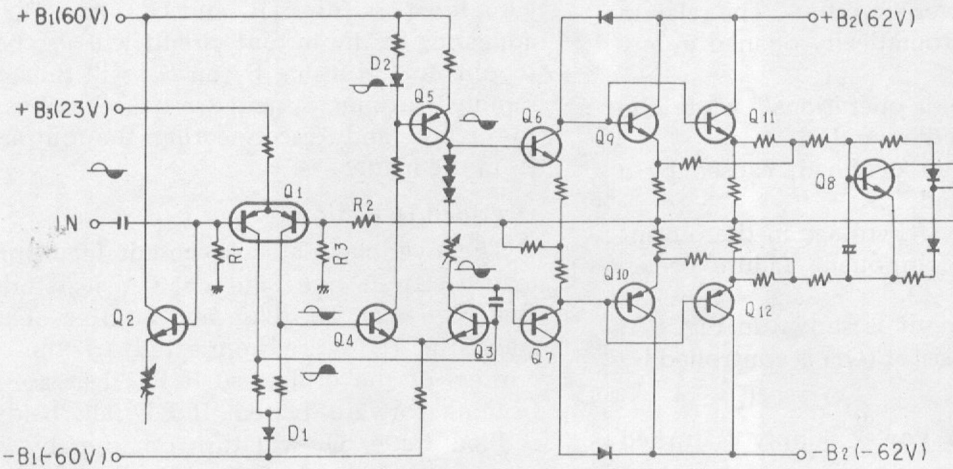

+B1(60V)
+B3(23V)
IN
Q1
R1
R2
R3
Q2
D1
D2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
-B1(-60V)
+B2(62V)
-B2(-62V)
Protection Ass'y
OUT

Fig. 5 Block diagram of power amplifier

Q_2 is a Q_1 temperature compensation transistor which prevents changes in the center voltage due to the temperature characteristic of Q_1. Since the output center voltage is applied to the feedback side base of Q_1 by R_2 and R_3, the input side base potential of Q_1 becomes the standard. Therefore, the input side base potential of Q_1 must be maintained constant at 0V. The voltage generated across R_1 by the input side base current of Q_1 is cancelled by the base current of Q_2 to maintain the input side base potential of Q_1 constant at 0V.

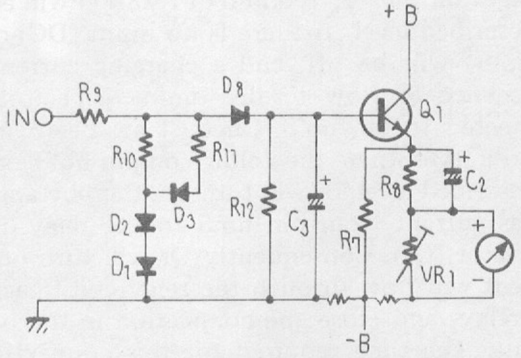

+B
IN
R9
D8
Q1
R10
R11
D3
D2
D1
R12
C3
R8
C2
R7
VR1
+
-
-B

Fig. 6 Schematic diagram of meter amplifier

8.6 METER AMPLIFIER

In order to indicate the 0.01W - 120W range with one meter without range switching, a logarithmic indication type meter must be employed and the input signal must be logarithmically compressed. The meter amplifier circuit is shown in Fig. 6.

This circuit consists of a logarithmic compression circuit and a meter drive circuit. The output signal of the power amplifier is applied to the logarithmic compression circuit, and its dynamic range is compressed.

The principles of the logarithmic compression circuit are given in Fig. 7. The output voltage of this circuit is the value divided by R_9 and Z. The attenuation at low signal input is reduced and the attenuation at large signal input is increased, by using the rise of the diode current - voltage characteristic at Z.

The compressed signal is shaped by D_8 and applied to Q_1 of the meter drive circuit. Q_1 current amplifies the DC voltage from D_8 to drive the power meter.

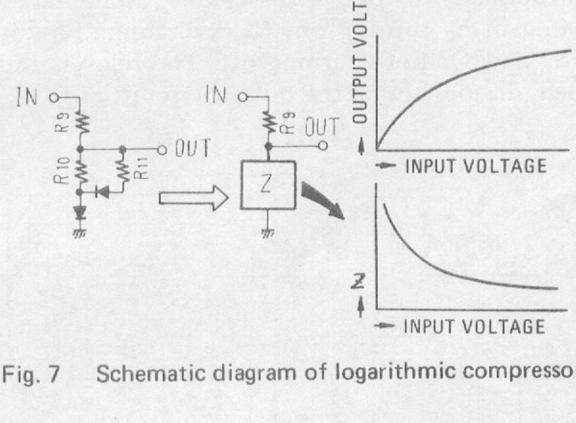

IN
R9
R10
R11
OUT
IN
R9
OUT
Z
OUTPUT VOLTAGE
INPUT VOLTAGE
Z
INPUT VOLTAGE

Fig. 7 Schematic diagram of logarithmic compressor

8.7 PROTECTION CIRCUIT

The purpose of this circuit is to protecty both the speakers and the power amplifiers. The relay in the output circuit is automatically opened in any of the following cases:

1. During the "transient operations" when the power supply is turned on and off.
2. Upon detection of an overload, caused by a short circuit in the load.
3. Upon detection of a DC voltage in the output circuit, caused by component failure or accident.

An outline of this circuit is shown in Fig. 8-1. The relay-activating transistor (Qr) is controlled by the IC (PA3004).

Muting Operation When Power Supply Is turned Off and On (Fig. 8-1)

When the power supply is first turned on, the voltages on pins 1, 7, and 6 of PA3004 will exceed a prescribed level. If there is no input (DC) on pin no.4, S_2 will be off, and a charging current will commence to flow to the timing capacitor (Ct) connected to pin no.8. Once Ct has been charged up to a level where the voltage on pin no.8 exceeds a prescribed level, S_1 will turn on, thereby applying a bias current from pin no.3 to the relay driving transistor (Qr). Consequently Qr will turn on, and current will flow through the relay coil to activate the relay, and close the connection in the output circuit. The time required for this connection to close after the power supply is first turned on is several seconds. During this period, any unwanted transient noises will be therefore muted.

When the power supply is turned off, the input (AC) applied to pin no.7 ceases immediately, resulting in S_2 turning on, Ct discharging rapidly, and S_1 and Qr both turning off. The relay is thus opened, disconnecting the output circuit.

DC Voltage Detector (Fig. 8-1)

The output circuit is connected to pin no.4 via a low-pass filter (R_8 and C_2). Any DC voltages appearing in the output circuit will also be applied to pin no.4, turning S_2 on. Ct will thus discharge rapidly, turning S_1 and Qr off, thereby releasing the relay, and disconnecting the output circuit from the load.

Overload Detection

The overload detector circuit incorporates the load (RL) in one side of a Wheatstone bridge (see Fig. 8-2). The base and emitter of a sensing transistor (Q_1) are connected to the opposite corners of the bridge, so if RL decreases, Q_1 will become forward biased. If RL falls below a prescribed value, Q_1 will turn on, thereby passing a current through R_5, D_3 and R_6. Due to the voltage difference generated across R_6, Q_2 will become forward biased, and consequently turn on. A DC voltage will then be applied to pin no.4, turning S_2 on, and resulting in the rapid discharge of Ct, and S_1 and Qr both turning off. The relay will again be released to disconnect the output circuit.

8.8 POWER SUPPLY

The power amplifier and power stage plus and minus supply voltages (±62V) are obtained by means of a bridge full-wave rectification system. 22000/71 × 2 electrolytic capacitors are used.

Plus and minus voltages are supplied to the small signal circuit of the AF Section thru a constant voltage circuit by full-wave rectification from a winding separate from the power stage supply. Tuner section, lamp circuit and protection circuit power is supplied thru transistors Darlington connected ripple tilter, after full-wave rectification.

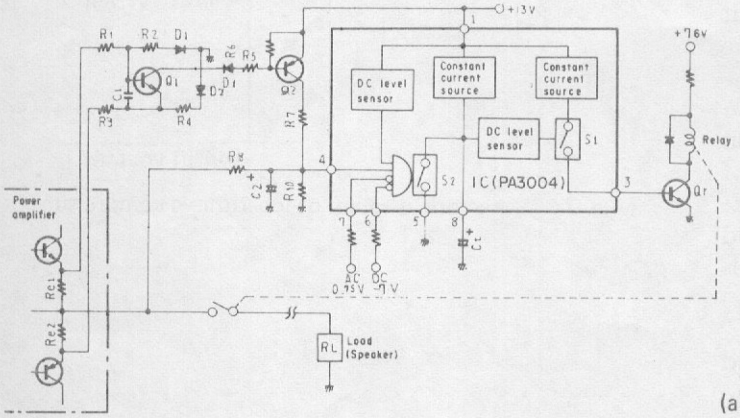
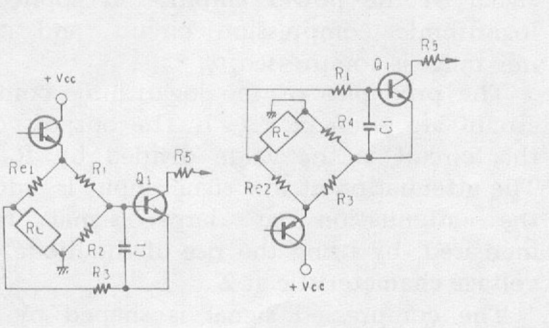


Fig. 8-1 Schematic diagram of protection



(a) Positive half-cycle bridge (b) Negative half-cycle bridge

Fig. 8-2

9. ADJUSTMENT

9.1 AM TUNER

- Confirm that the dial pointer is at the start point.
- Connect as shown in Fig. 9, and set the FUNCTION switch to "AM".

1. Set an AM signal generator to 400Hz, 30% modulation, 30dB output, at no input from AGC.
2. Set the AM signal generator and the SX-1080 dial pointer to 600kHz, and adjust T_7 for maximum output.
3. Set the AM signal generator and the SX-1080 dial pointer to 1400kHz, and adjust TC_6 for maximum output.
4. Repeat steps 2 and 3 until reception is perfect at 600kHz and 1400kHz.
5. Adjust F_6 for maximum output.
6. Adjust the core of the bar antenna (at 600kHz reception) and trimmer TC_5 (at 1400kHz reception) for maximum output and minimum output deviation at 600kHz and 1400kHz.

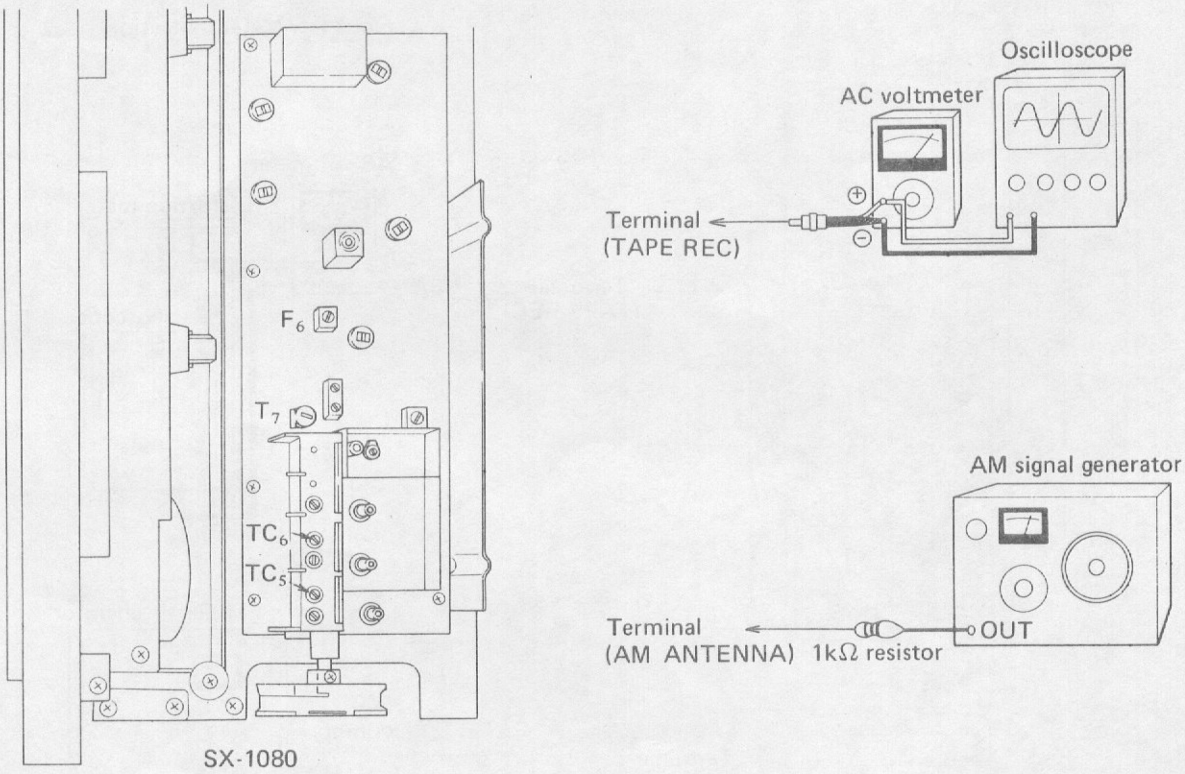

F6
T7
TC6
TC5
SX-1080
Oscilloscope
AC voltmeter
Terminal
(TAPE REC)
AM signal generator
Terminal
(AM ANTENNA)
1kΩ resistor
OUT

Fig. 9 Connection of AM tracking adjustment

9.2 FM TUNER

- Confirm that the dial is set to te start point.
- Connect as shown in Fig. 10, and set the FUNCTION switch to "FM" and the MUTING switch to "OFF".

1. Set an FM signal generator to 400Hz, 100% modulation 66dB output.
2. Set TC_4 to near center capacitance, set the FM signal generator and the SX-1080 dial pointer to 90MHz, and adjust T_4 for maximum deflection at the signal meter.
3. Under the state of "2" above, adjust the primary (bottom) core of T_6 so that the pointer of the tuning meter deflects to the center of the scale.
4. Set the FM signal generator output to 15dB, and adjust T_1, T_2, T_3 for maximum output.
5. Set the FM signal generator and the SX-1080 dial pointer to 106MHz, and adjust TC_4 for maximum deflection at the signal meter. (Make the FM signal generator output 10dB).
6. Set the FM signal generator output to 15dB, and adjust TC_1, TC_2, TC_3 for maximum output.
7. Repeat steps 2 - 6 until reception at 90MHz and 106MHz is perfect. At this time, adjust T_5 for maximum output.
8. Adjust the primary core (bottom) of T_6 so that the pointer of the tuning meter deflects to the center of the scale in the untuned state (noise only).
9. Set the FM signal generator output to 66dB, set the SX-1080 dial pointer to 98MHz, and tune the FM signal generator at the tuning meter. (Pointer of tuning meter deflects to the center of the scale).
10. Adjust the secondary side (top) of T_6 for minimum distortion.
11. Repeat steps 8 - 10 until the minimum distortion point does not change.
12. Set the FM signal generator output to 100dB, and adjust VR_2 for maximum deflection at the signal meter (Fig. 11).
13. Set the FM signal generator output to 26 dB. Set the MUTING switch to "ON" and adjust VR1 so that the output waveform disappears.

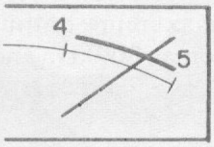


Fig. 11 Meter deflection

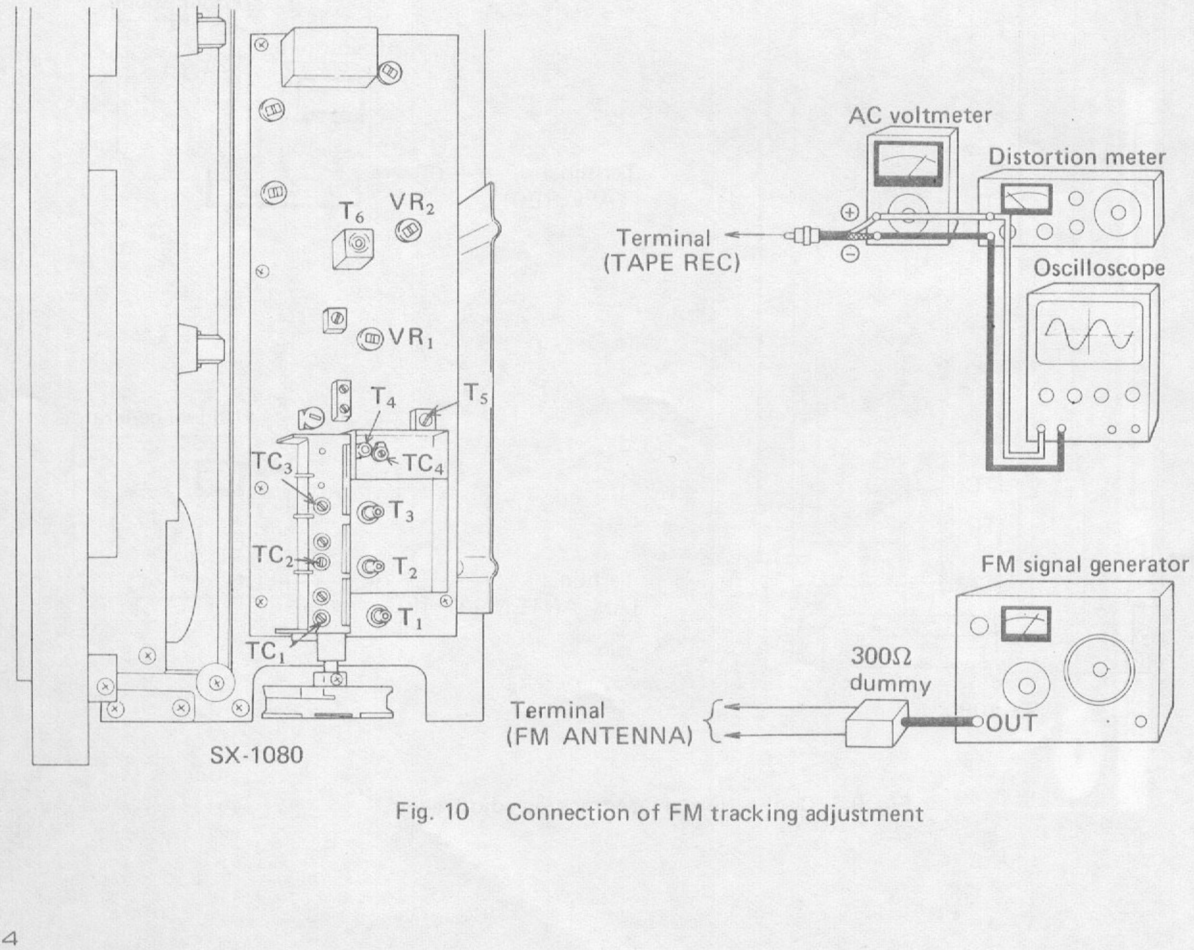


Fig. 10 Connection of FM tracking adjustment

9.3 FM MPX

- Connect as shown in Fig. 12, and set the FUNCTION switch to "FM" and the MUTING switch to "OFF".

1. Set the FM signal generator to 98MHz unmodulated, 66dB output.
2. Connect the output of the MPX SG PILOT OUT terminal to the horizontal axis input terminal of an oscilloscope and tuner ass'y terminal 13 to the vertical axis input.
3. Set the SX-1080 dial pointer to 98MHz and adjust the FM signal generator so that the tuning meter deflects to the center of the scale.
4. Adjust VR_3 so that a Lissajous pattern is traced on the oscilloscope (Fig. 13).
5. Modulate the MPX SG at L+R (1kHz) to deviate the 67.5kHz pilot signal (19kHz) 7.5kHz.
6. Adjust T_5 for minimum L channel or R channel distortion. (However, within ±90% of the core adjustment range).
7. Make the MPX SG main signal L or R and adjust VR_4 for best separation.
8. Next, set the MPX SG to 7.5kHz by pilot signal (19kHz).
9. Adjust VR_5 for minimum output.

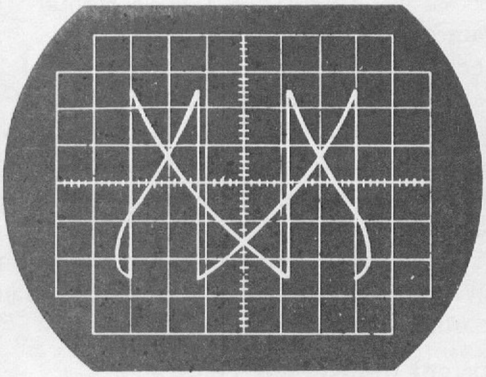


Fig. 13 Lissajous pattern

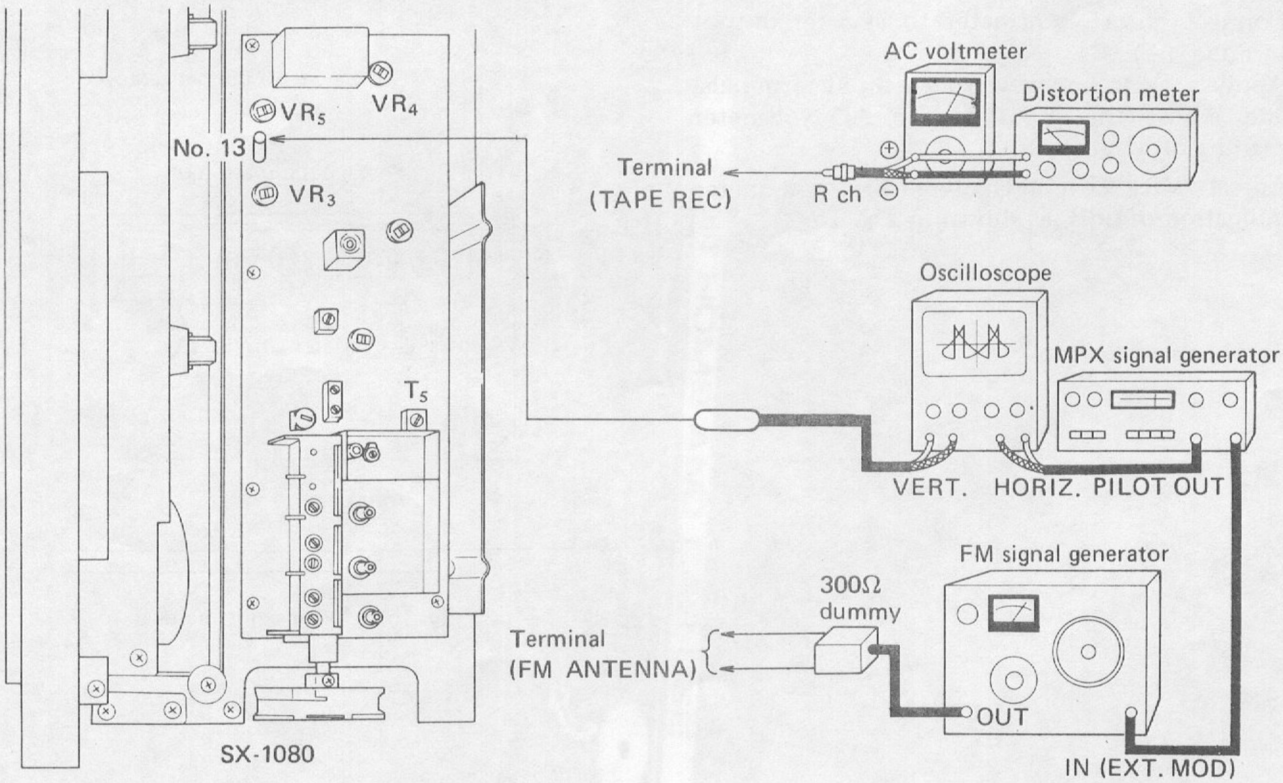

VR_5
VR_4
No. 13
VR_3
T_5
SX-1080
AC voltmeter
Distortion meter
⊕
Terminal
(TAPE REC)
R ch ⊖
Oscilloscope
MPX signal generator
VERT.
HORIZ.
PILOT OUT
FM signal generator
300Ω
dummy
Terminal
(FM ANTENNA)
OUT
IN (EXT. MOD)

Fig. 12 Connection of FM MPX adjustment

9.4 POWER AMPLIFIER

Center Voltage Adjustment

1. Connect a DC voltmeter between power amplifier ass'y (AWH-071) L-ch terminal 10 and ground.
2. Check if the voltage between terminal 10 and ground is 0V, adjust to 0V with VR_2.
3. When 0V cannot be obtained by performing the adjustment of item 2 above, cut the jumper wire shown in Fig. 14 and adjust to 0V with VR2.
4. Thr R-ch also uses the power amplifier ass'y (AWH-071). Check and adjust this channel in accordance with items 1 - 3 above.

Idle Current Adjustment

1. Connect a DC voltmeter between terminals 13-23 of the power amplifier ass'y (AWH-071) L-ch side.
2. Set the power switch to "ON", wait 10 minutes, and then check if the DC voltmeter reads 30mV. If it doesn't read 30mV, adjust to 30mV by turning VR_1.
3. The R-ch also uses the power amplifier ass'y (AWH-071). Check and adjust this channel in accordance with items 1 - 4 above.

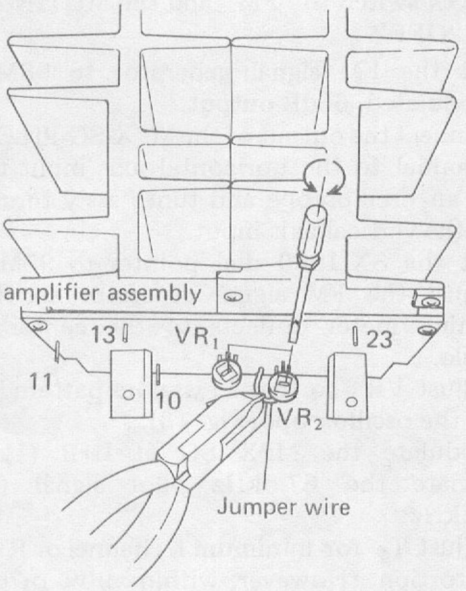

Power amplifier assembly
13
VR_1
23
11
10
VR_2
Jumper wire

Fig. 14 Power amplifier adjustment

9.5 METER AMPLIFIER

1. Push speaker selector switch button "A".
2. Connect an AC voltmeter to speaker output terminal (A).
3. Apply a 1kHz sine wave to the input terminals, and adjust the input for an AC voltmeter reading of 31V.
4. Adjust VR_1 (L) and VR_2 (R) for a meter indication of 0dB, as shown in Fig. 15.

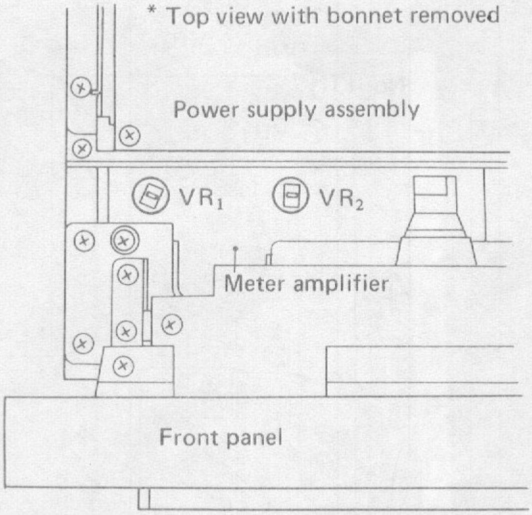

* Top view with bonnet removed
Power supply assembly
VR_1
VR_2
Meter amplifier
Front panel

Fig. 15 Meter adjustment

10. DIAL CORD STRINGING

Remove the bonnet and front panel as described in "Disassembly" on page 10. Loosen screws ❶ - ❸ and remove the blind sash as shown in Fig. 16.

1. Turn the front-end variable capacitor shaft fully clockwise (Vanes of capacitor fully inside.)
2. Tie one end of the string to the peg on the dial pulley.
3. Position the dial pulley so that the set screw is at the top and tighten the screw.
4. Pass the string through the notch in the dial pulley, wrap it 1/2 turn around the pulley and pass it thru pulley A → B pulley C → dial shaft (3 turns) → pulley D. Next, wrap the string two turns around the pulley, along the pulley grooves, and tie it to the spring hook.
5. Turn the dial shaft and confirm that the movement of the dial pulley and string is normal, and then cut off the surplus tring.
6. Turn the dial shaft counter clockwise (variable capacitor vanes fully outside) and set the dial pointer to the start point of the scale and attach it to the string.

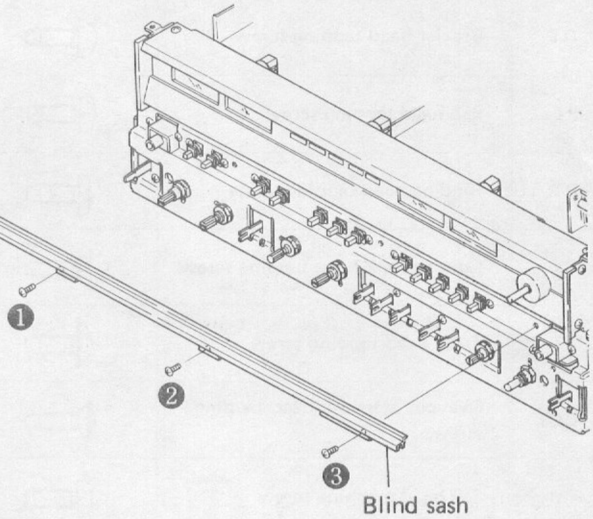

❶
❷
❸
Blind sash

Fig. 16 Remove blind sash

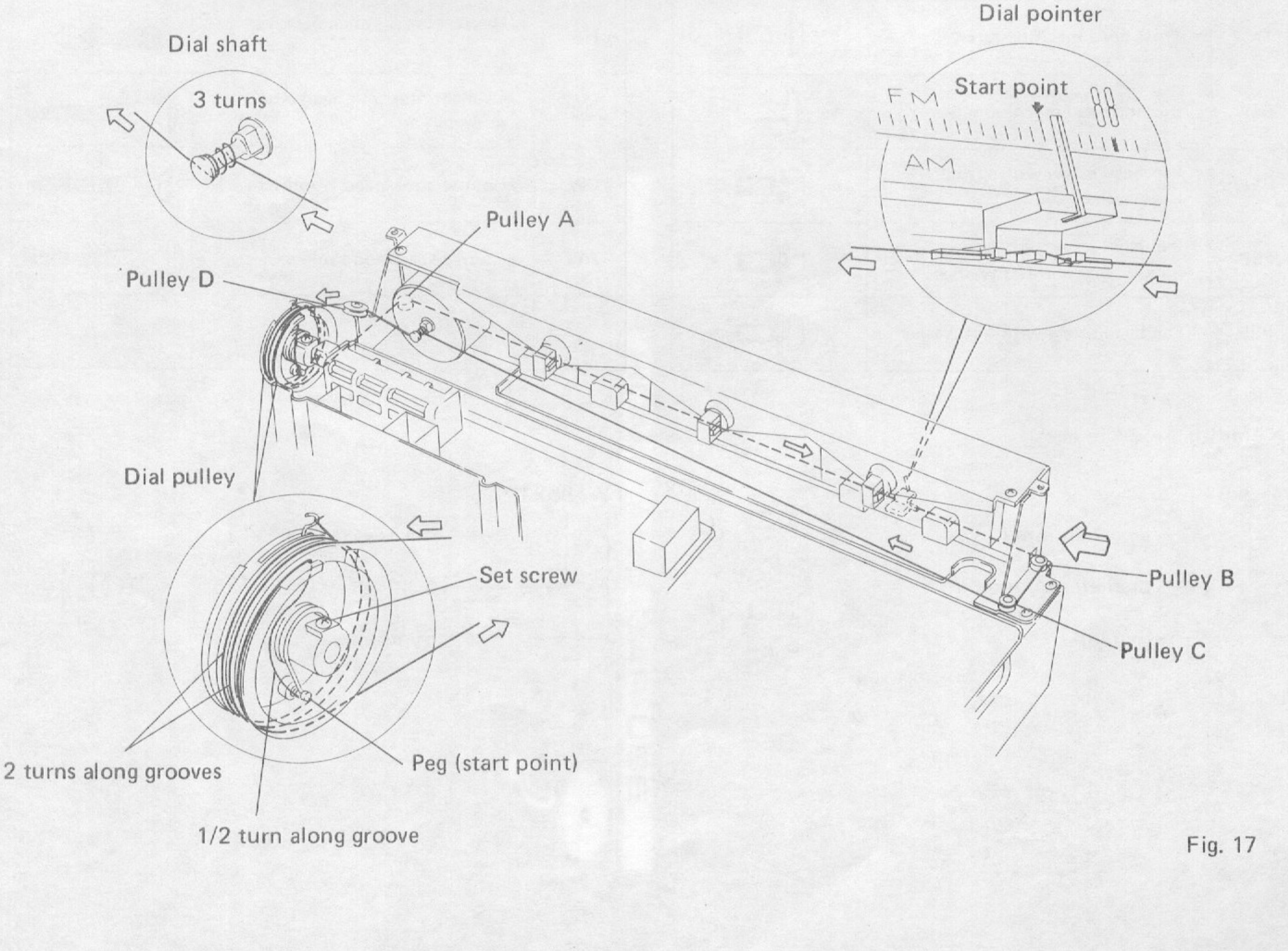
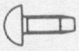
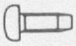
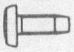
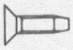
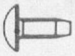
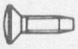
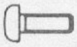
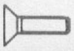
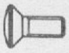
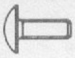
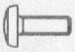
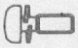
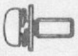
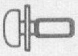
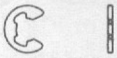
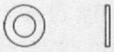
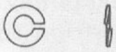
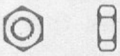
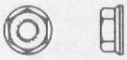
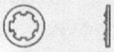
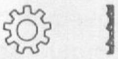
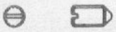
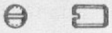
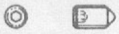
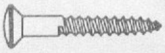
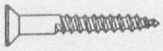
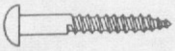

Dial shaft
3 turns
Dial pointer
FM
Start point
AM
Pulley A
Pulley D
Dial pulley
Set screw
Pulley B
Pulley C
2 turns along grooves
Peg (start point)
1/2 turn along groove

Fig. 17

11. EXPLODED VIEWS

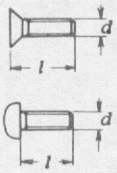
The following symbols stand for screws, washers and nuts as shown in exploded view.

Symbol	Description	Shape
RT	Brazier head tapping screw	
PT	Pan head tapping screw	
BT	Binding head tapping screw	
CT	Countersunk head tapping screw	
TT	Truss head tapping screw	
OCT	Oval countersunk head tapping screw	
PM	Pan head machine screw	
CM	Countersunk head machine screw	
OCM	Oval countersunk head machine screw	
TM	Truss head machine screw	
BM	Binding head machine screw	
PSA	Pan head screw with spring lock washer	
PSB	Pan head screw with spring lock washer and flat washer	
PSF	Pan head screw with flat washer	

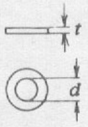
Symbol	Description	Shape
EW	E type washer	
FW	Flat washer	
SW	Spring lock washer	
N	Nut	
WN	Washer faced nut	
ITW	Internal toothed lock washer	
OTW	Outernal toothed lock washer	
SC	Slotted set screw (Cone point)	
SF	Slotted set screw (Flat point)	
HS	Hexagon socket headless set screw	
OCW	Oval countersunk head wood screw	
CW	Countersunk head wood screw	
RW	Round head wood screw	

EXAMPLE

PM · 3x8
length in mm (l)
diameter in mm (d)
Symbol

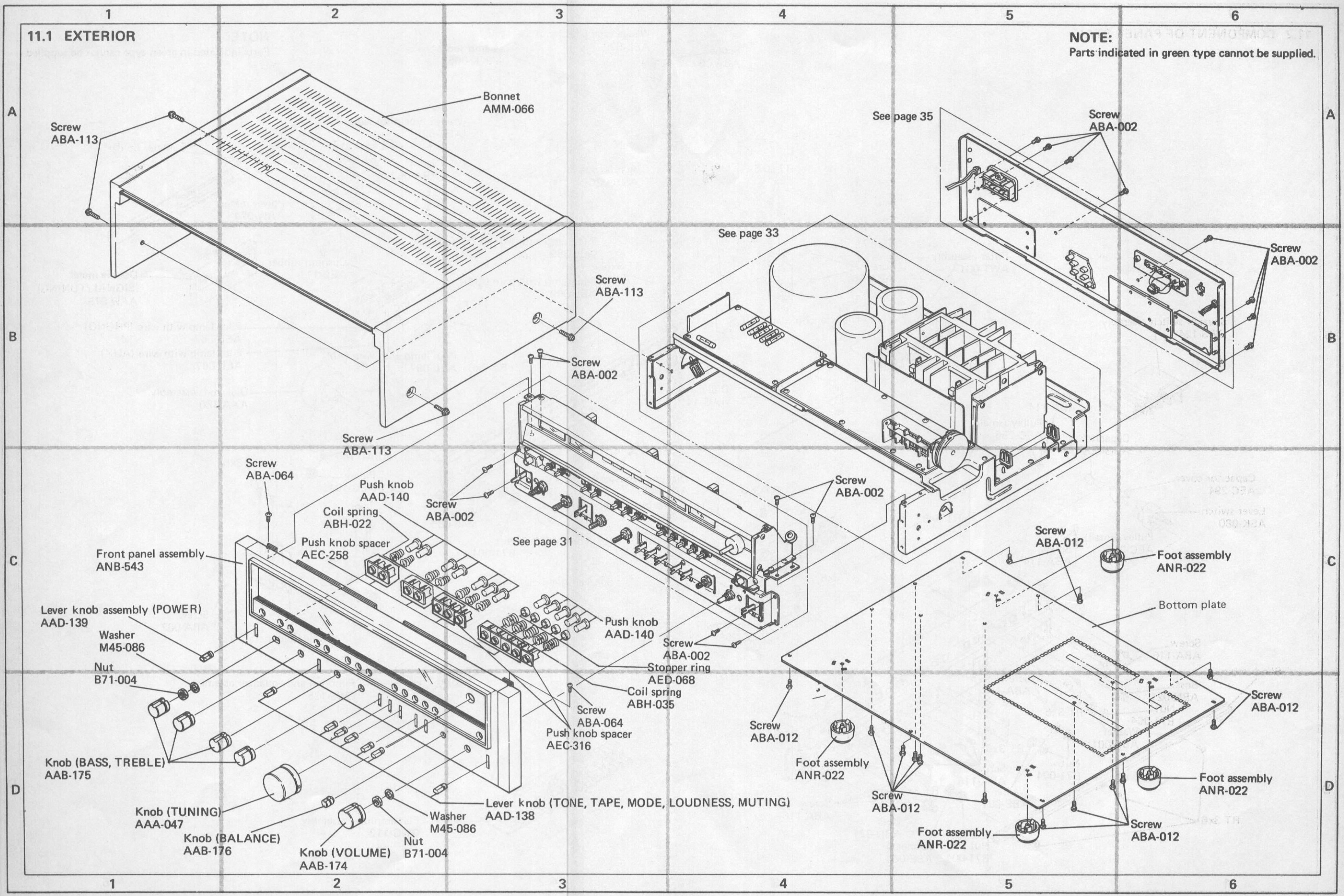


FW · 9ϕx1^t
thickness in mm (t)
diameter in mm (d)
Symbol



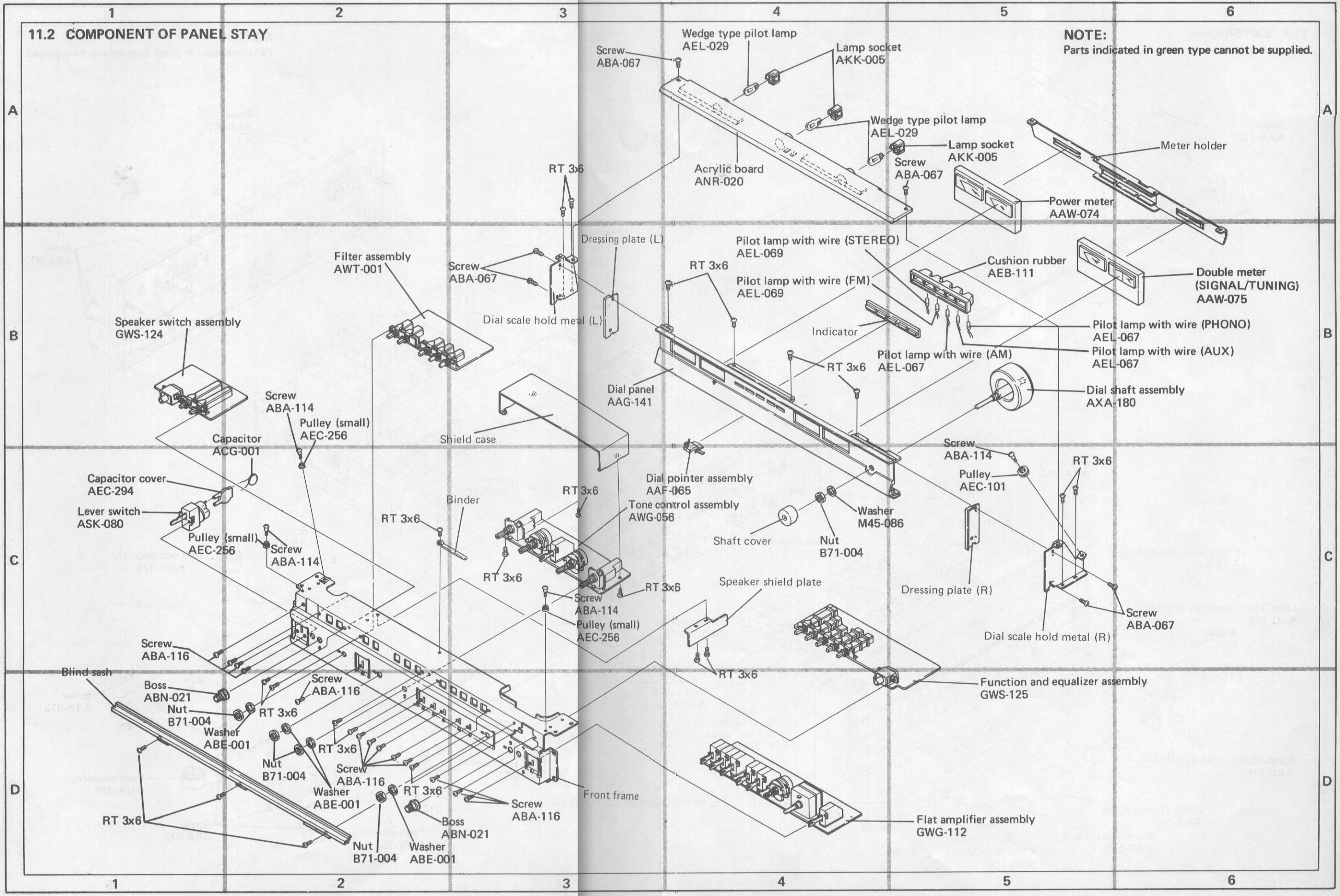
11.1 EXTERIOR

NOTE:
Parts indicated in green type cannot be supplied.


1
2
3
4
5
6
A
B
C
D
Screw
ABA-113
Bonnet
AMM-066
Screw
ABA-113
Screw
ABA-113
Screw
ABA-002
See page 33
See page 35
Screw
ABA-002
Screw
ABA-002
Screw
ABA-064
Push knob
AAD-140
Coil spring
ABH-022
Push knob spacer
AEC-258
Screw
ABA-002
See page 31
Screw
ABA-002
Front panel assembly
ANB-543
Lever knob assembly (POWER)
AAD-139
Washer
M45-086
Nut
B71-004
Knob (BASS, TREBLE)
AAB-175
Knob (TUNING)
AAA-047
Knob (BALANCE)
AAB-176
Knob (VOLUME)
AAB-174
Nut
B71-004
Washer
M45-086
Lever knob (TONE, TAPE, MODE, LOUDNESS, MUTING)
AAD-138
Push knob spacer
AEC-316
Screw
ABA-064
Coil spring
ABH-035
Stopper ring
AED-068
Push knob
AAD-140
Screw
ABA-002
Screw
ABA-012
Foot assembly
ANR-022
Bottom plate
Screw
ABA-012
Screw
ABA-012
Foot assembly
ANR-022
Screw
ABA-012
Foot assembly
ANR-022
Foot assembly
ANR-022
Screw
ABA-012

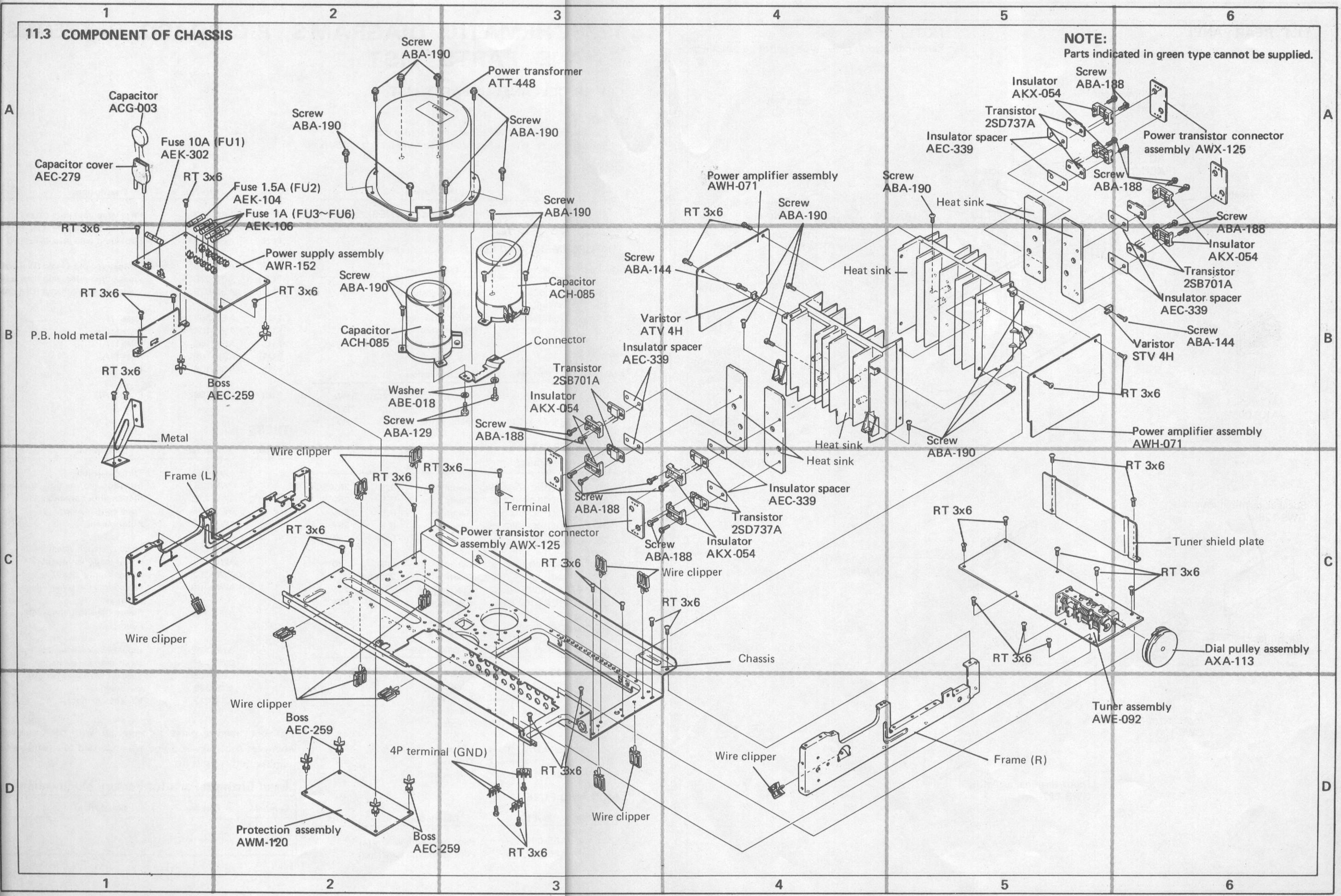
11.2 COMPONENT OF PANEL STAY

NOTE:
Parts indicated in green type cannot be supplied.


1
2
3
4
5
6
A
B
C
D
Screw
ABA-067
Wedge type pilot lamp
AEL-029
Lamp socket
AKK-005
Wedge type pilot lamp
AEL-029
Lamp socket
AKK-005
Screw
ABA-067
Meter holder
Acrylic board
ANR-020
RT 3x6
Power meter
AAW-074
Dressing plate (L)
Pilot lamp with wire (STEREO)
AEL-069
Cushion rubber
AEB-111
Double meter
(SIGNAL/TUNING)
AAW-075
Filter assembly
AWT-001
Screw
ABA-067
RT 3x6
Pilot lamp with wire (FM)
AEL-069
Speaker switch assembly
GWS-124
Dial scale hold meal (L)
Indicator
Pilot lamp with wire (PHONO)
AEL-067
Pilot lamp with wire (AUX)
AEL-067
Pilot lamp with wire (AM)
AEL-067
RT 3x6
Dial panel
AAG-141
Dial shaft assembly
AXA-180
Screw
ABA-114
Pulley (small)
AEC-256
Capacitor
ACG-001
Shield case
Screw
ABA-114
Pulley
AEC-101
RT 3x6
Capacitor cover
AEC-294
Dial pointer assembly
AAF-065
RT 3x6
Binder
Tone control assembly
AWG-056
Washer
M45-086
Lever switch
ASK-080
RT 3x6
Pulley (small)
AEC-256
Screw
ABA-114
Shaft cover
Nut
B71-004
RT 3x6
Speaker shield plate
RT 3x6
Screw
ABA-114
Pulley (small)
AEC-256
Dressing plate (R)
Screw
ABA-067
Dial scale hold metal (R)
Screw
ABA-116
Blind sash
Boss
ABN-021
Screw
ABA-116
Nut
B71-004
RT 3x6
RT 3x6
Function and equalizer assembly
GWS-125
Washer
ABE-001
RT 3x6
Nut
B71-004
Screw
ABA-116
Washer
ABE-001
RT 3x6
Front frame
Screw
ABA-116
RT 3x6
Boss
ABN-021
Flat amplifier assembly
GWG-112
Nut
B71-004
Washer
ABE-001
1
2
3
4
5
6

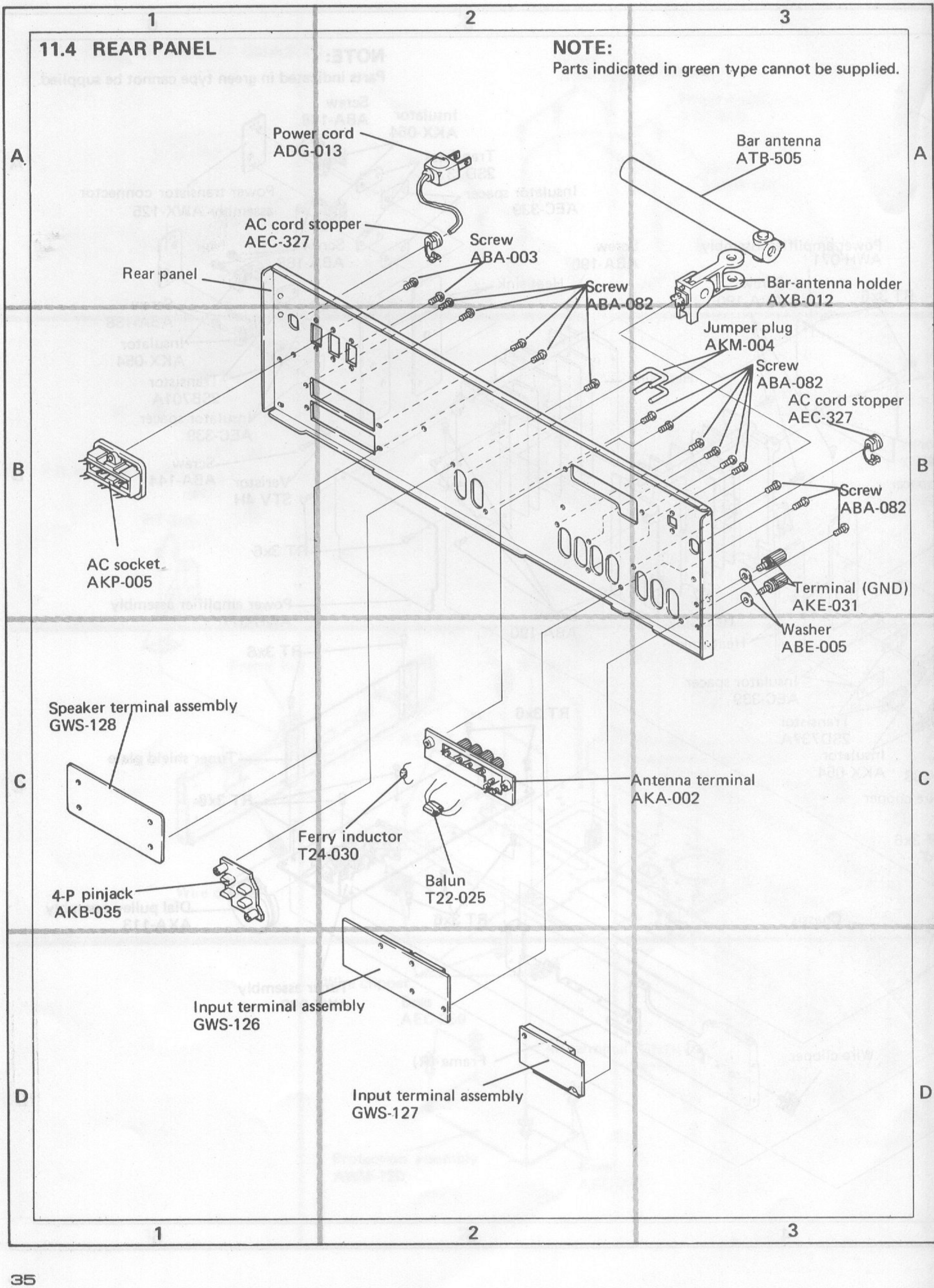
11.3 COMPONENT OF CHASSIS

NOTE:
Parts indicated in green type cannot be supplied.


1
2
3
4
5
6
A
B
C
D
Capacitor
ACG-003
Fuse 10A (FU1)
AEK-302
Capacitor cover
AEC-279
RT 3x6
Fuse 1.5A (FU2)
AEK-104
Fuse 1A (FU3~FU6)
AEK-106
RT 3x6
Power supply assembly
AWR-152
RT 3x6
RT 3x6
P.B. hold metal
Boss
AEC-259
RT 3x6
Metal
Frame (L)
Wire clipper
Screw
ABA-190
Power transformer
ATT-448
Screw
ABA-190
Screw
ABA-190
Screw
ABA-190
Screw
ABA-190
Capacitor
ACH-085
Capacitor
ACH-085
Connector
Washer
ABE-018
Screw
ABA-129
Wire clipper
RT 3x6
RT 3x6
Terminal
Screw
ABA-188
Transistor
2SB701A
Insulator
AKX-054
Power transistor connector
assembly AWX-125
RT 3x6
RT 3x6
Wire clipper
RT 3x6
Chassis
Wire clipper
Boss
AEC-259
4P terminal (GND)
RT 3x6
Protection assembly
AWM-120
Boss
AEC-259
RT 3x6
Wire clipper
Power amplifier assembly
AWH-071
RT 3x6
Screw
ABA-144
Screw
ABA-190
Varistor
ATV 4H
Insulator spacer
AEC-339
Screw
ABA-188
Screw
ABA-188
Insulator spacer
AEC-339
Transistor
2SD737A
Insulator
AKX-054
Heat sink
Heat sink
Heat sink
Screw
ABA-190
Heat sink
Screw
ABA-190
Wire clipper
Frame (R)
Insulator
AKX-054
Screw
ABA-188
Transistor
2SD737A
Insulator spacer
AEC-339
Power transistor connector
assembly AWX-125
Screw
ABA-188
Screw
ABA-188
Insulator
AKX-054
Transistor
2SB701A
Insulator spacer
AEC-339
Screw
ABA-144
Varistor
STV 4H
RT 3x6
Power amplifier assembly
AWH-071
RT 3x6
RT 3x6
Tuner shield plate
RT 3x6
RT 3x6
Dial pulley assembly
AXA-113
Tuner assembly
AWE-092

11.4 REAR PANEL

NOTE:
Parts indicated in green type cannot be supplied.


1
2
3
A
B
C
D
Power cord
ADG-013
AC cord stopper
AEC-327
Rear panel
Screw
ABA-003
Screw
ABA-082
Bar antenna
ATB-505
Bar-antenna holder
AXB-012
Jumper plug
AKM-004
Screw
ABA-082
AC cord stopper
AEC-327
Screw
ABA-082
Terminal (GND)
AKE-031
Washer
ABE-005
AC socket
AKP-005
Speaker terminal assembly
GWS-128
Antenna terminal
AKA-002
Ferry inductor
T24-030
Balun
T22-025
4-P pinjack
AKB-035
Input terminal assembly
GWS-126
Input terminal assembly
GWS-127

12. SCHEMATIC DIAGRAMS, P.C.BOARD PATTERNS AND PARTS LIST

12.1 MISCELLANEOUS PARTS LIST

NOTE:
- *Capacitors: in μF unless otherwise noted p:pF*
- *Resistors: in Ω, ¼W unless otherwise noted k:kΩ, M:MΩ*

SWITCH

Symbol	Part No.	Description
S1	ASK-080	Lever Switch (POWER)
S2	ASR-046	

TRANSFORMERS AND COILS

Symbol	Part No.	Description
T1	T22-025	Balun transformer
T2	ATB-505	Bar antenna
T3	T24-030	Ferry inductor
T4	ATT-448	Power transformer

RESISTOR

Symbol	Part No.	Description		
R1	RD½PS 225J	Carbon film	2.2M	½W
R2	RS 2P 122J	Metal oxide	1.2k	2W
R3	RS 2P 122J	Metal oxide	1.2k	2W

CAPACITORS

Symbol	Part No.	Description		
C1	CKDBC 104Z 25	Ceramic	0.1	25V
C2	CKDBC 104Z 25	Ceramic	0.1	25V
C3	CKDBC 104Z 25	Ceramic	0.1	25V
C4	CKDBC 104Z 25	Ceramic	0.1	25V
C5	ACG-001	Ceramic	0.01	250V
C6	ACG-003	Ceramic	0.01	125V
C7	ACH-085	Electrolytic	22000	71V
C8	ACH-085	Electrolytic	22000	71V
C9	CEA 010P 80	Electrolytic	1	80V

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SD737/A/-B or C	Transistor
Q2	2SD737/A/-B or C	Transistor
Q3	2SB701/A/-B or C	Transistor
Q4	2SB701/A/-B or C	Transistor
Q5	2SD737/A/-B or C	Transistor
Q6	2SD737/A/-B or C	Transistor
Q7	2SB701/A/-B or C	Transistor
Q8	2SB701/A/-B or C	Transistor

LAMPS AND FUSES

Symbol	Part No.	Description
PL1	AEL-069	Pilot lamp with wire (FM)
PL2	AEL-067	Pilot lamp with wire (AM)
PL3	AEL-067	Pilot lamp with wire (AUX)
PL4	AEL-067	Pilot lamp with wire (PHONO)
PL5	AEL-069	Pilot lamp with wire (STEREO IND.)
PL7	AEL-029	Wedge typa pilot lamp (Dial scale)
PL8	AEL-029	Wedge type pilot lamp (Dial scale)
PL9	AEL-029	Wedge type pilot lamp (Dial scale)
FU1	AEK-302	Fuse (10A)
FU2	AEK-104	Fuse (1.5A)
FU3	AEK-106	Fuse (1A)
FU4	AEK-106	Fuse (1A)
FU5	AEK-106	Fuse (1A)
FU6	AEK-106	Fuse (1A)

OTHERS

Symbol	Part No.	Description
	AWE-092	Tuner assembly
	GWS-125	Function and equalizer assembly
	GWG-112	Flat amplifier assembly
	AWG-056	Tone control assembly
	AWT-001	Filter assembly
	GWS-124	Speaker switch assembly
	AWH-071	Power amplifier assembly
	AWR-152	Power supply assembly
	AWM-120	Protection and surge killer assembly
	AWX-125	Power transistor connector assembly
	GWS-126	Input terminal assembly
	GWS-127	Input terminal assembly
	GWS-128	Speaker terminal assembly
	ATB-505	Bar antenna
	AXB-012	Bar antenna holder

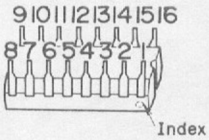
List of changed parts information will be furnished whenever necessary and you are requested to amend parts number in this parts list.

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

External Appearance of Transistor and ICs

PA1001-A
PA1002-A
PA3001-A
HA1197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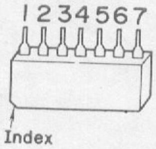
8 7 6 5 4 3 2 1
Index

TA7302P


1 2 3 4 5 6 7
Index

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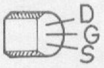
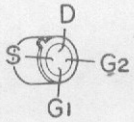
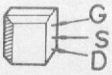
2SK68A



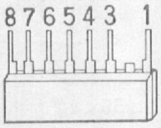
3SK45



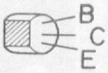
2SK55



HA1457



2SA733
2SA872A
2SC945A
2SC1438
2SC1775A
2SC1906
2SC1915



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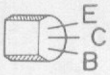
2SA904A
2SC869
2SC1312
2SC1914
2SC1919



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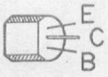
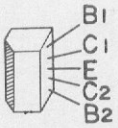
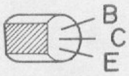
2SC1735



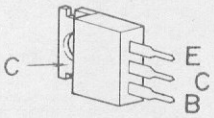
2SA979



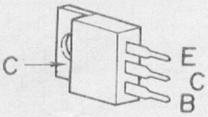
2SA684A
2SA912
2SC1384
2SC1885



2SB536A
2SD381A

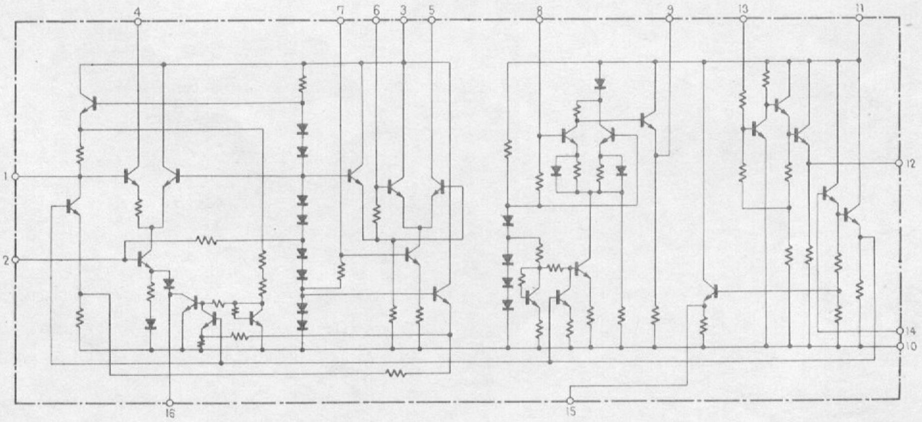


2SB682
2SD712

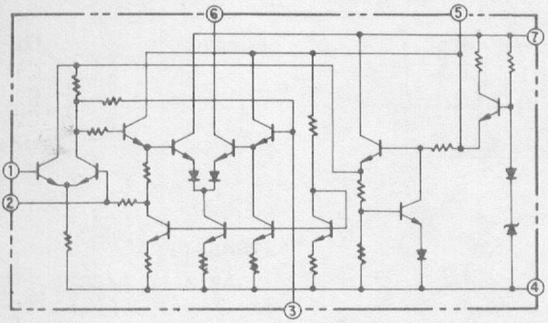


Circuit Diagram of IC

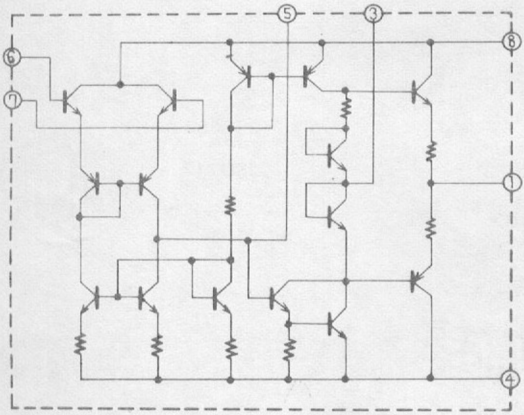
HA1197


4
7
6
3
5
8
9
13
11
1
2
12
14
10
16
15

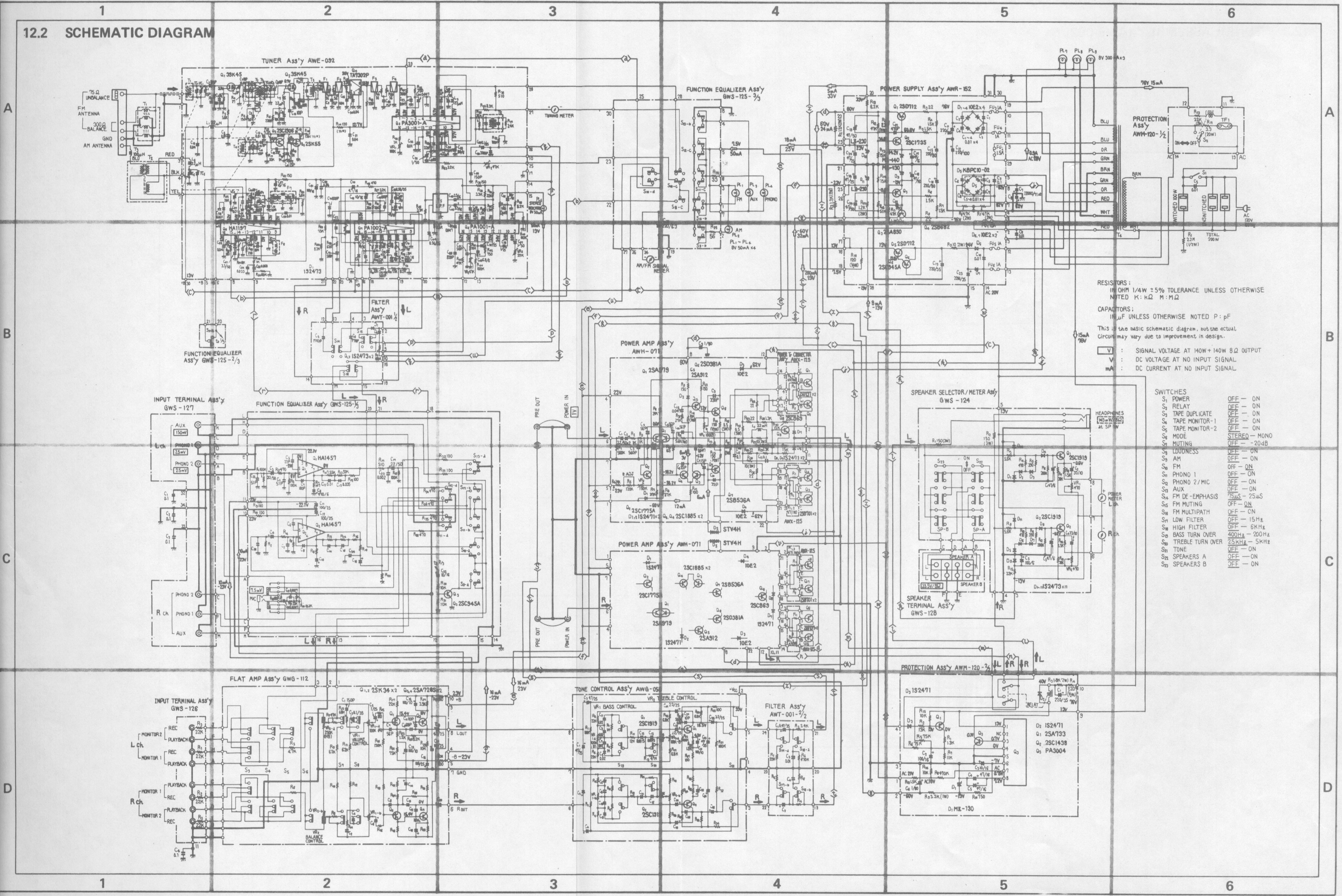
TA730P



HA1457



12.2 SCHEMATIC DIAGRAM


1
2
3
4
5
6
A
B
C
D
TUNER Ass'y AWE-032
75Ω UNBALANCE
FM ANTENNA
300Ω BALANCE
GND
AM ANTENNA
TUNING METER
FUNCTION EQUALIZER Ass'y GWS-125-2/3
AM/FM SIGNAL METER
FILTER Ass'y AWT-001-1/2
FUNCTION EQUALIZER Ass'y GWS-125-2/3
INPUT TERMINAL Ass'y GWS-127
FUNCTION EQUALIZER Ass'y GWS-125-1/3
POWER SUPPLY Ass'y AWR-152
PROTECTION Ass'y AWM-120-1/2
SWITCHED 100W
UNSWITCHED
TOTAL 200W
AC 120V
POWER AMP Ass'y AWH-071
PRE OUT
POWER IN
SPEAKER SELECTOR/METER Ass'y GWS-124
HEADPHONES 140mW/8Ω at SP 1W
POWER METER
SPEAKER TERMINAL Ass'y GWS-128
SPEAKERS A
SPEAKERS B
FLAT AMP Ass'y GWG-112
INPUT TERMINAL Ass'y GWS-126
MONITOR 2
MONITOR 1
REC
PLAYBACK
VOLUME CONTROL
BALANCE CONTROL
TONE CONTROL Ass'y AWG-051
BASS CONTROL
TREBLE CONTROL
FILTER Ass'y AWT-001-2/2
PROTECTION Ass'y AWM-120-2/2
RELAY
L ch
R ch
AUX
PHONO 1
PHONO 2
MIC

RESISTORS ;
IN OHM 1/4W ±5% TOLERANCE UNLESS OTHERWISE NOTED K: kΩ M: MΩ

CAPACITORS ;
IN μF UNLESS OTHERWISE NOTED P: pF

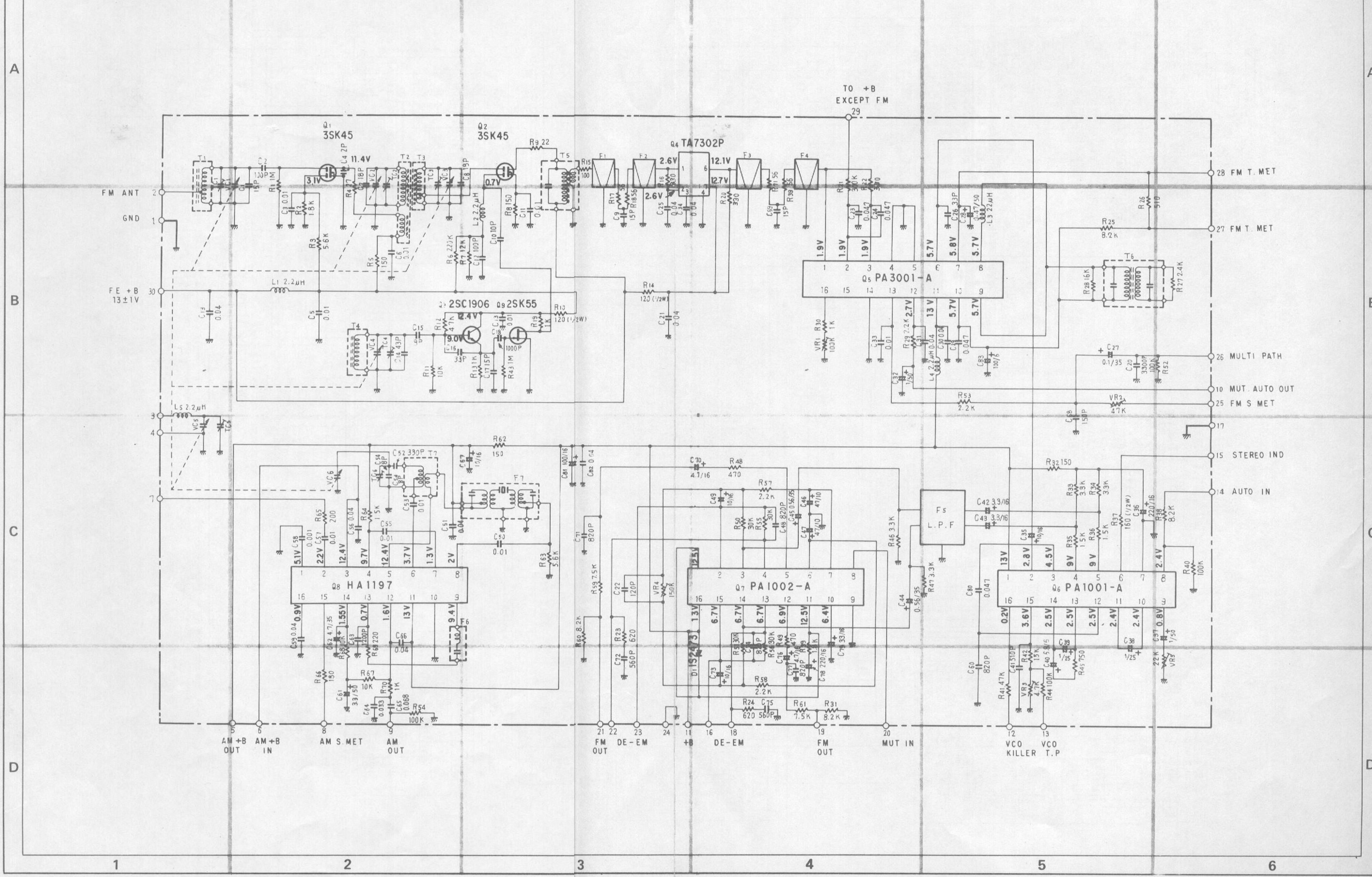
This is the basic schematic diagram, but the actual circuit may vary due to improvement in design.

$\boxed{V}$: SIGNAL VOLTAGE AT 140W + 140W 8Ω OUTPUT
V : DC VOLTAGE AT NO INPUT SIGNAL
mA : DC CURRENT AT NO INPUT SIGNAL

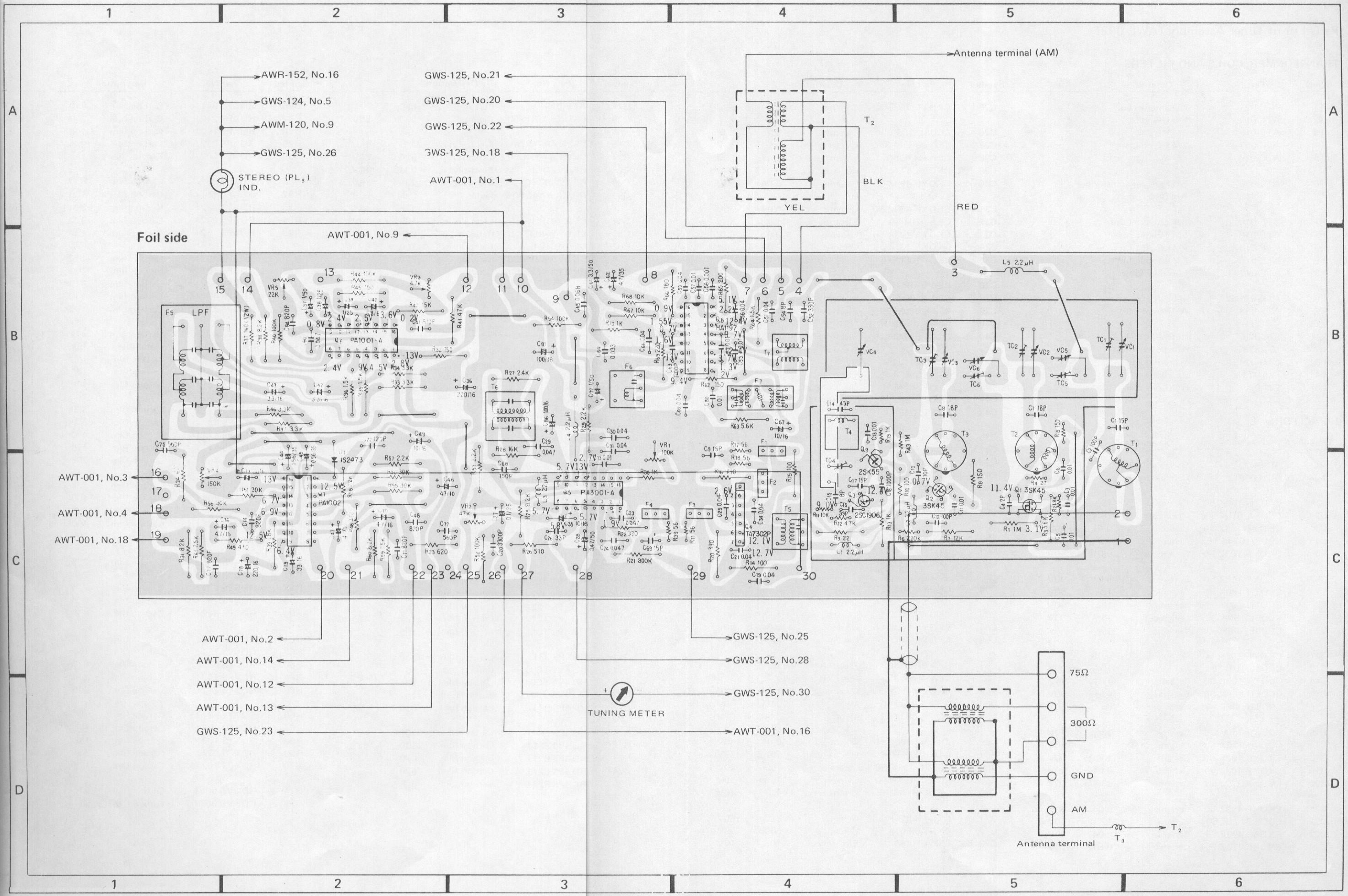
SWITCHES

S_1	POWER	OFF — ON
S_2	RELAY	OFF — ON
S_3	TAPE DUPLICATE	OFF — ON
S_4	TAPE MONITOR-1	OFF — ON
S_5	TAPE MONITOR-2	OFF — ON
S_6	MODE	STEREO — MONO
S_7	MUTING	OFF — -20dB
S_8	LOUDNESS	OFF — ON
S_9	AM	OFF — ON
S_{10}	FM	OFF — ON
S_{11}	PHONO 1	OFF — ON
S_{12}	PHONO 2/MIC	OFF — ON
S_{13}	AUX	OFF — ON
S_{14}	FM DE-EMPHASIS	75μS — 25μS
S_{15}	FM MUTING	OFF — ON
S_{16}	FM MULTIPATH	OFF — ON
S_{17}	LOW FILTER	OFF — 15Hz
S_{18}	HIGH FILTER	OFF — 6KHz
S_{19}	BASS TURN OVER	400Hz — 200Hz
S_{20}	TREBLE TURN OVER	2.5KHz — 5KHz
S_{21}	TONE	OFF — ON
S_{22}	SPEAKERS A	OFF — ON
S_{23}	SPEAKERS B	OFF — ON

12.3 TUNER ASSEMBLY (AWE-092)



TO +B
EXCEPT FM
29
FM ANT
GND
FE +B
13±1V
Q1
3SK45
Q2
3SK45
Q4 TA7302P
Q3 2SC1906
Q9 2SK55
Q5 PA3001-A
Q8 HA1197
Q7 PA1002-A
Q6 PA1001-A
D1 1S2473
F5
L.P.F
T1
T2
T3
T4
T5
T6
T7
F1
F2
F3
F4
F6
F7
L1 2.2μH
L2 2.2μH
L3 22μH
L4 2.2μH
L5 2.2μH
VR1 100K
VR2 47K
VR3 4.7K
VR4 150K
VR5 22K
28 FM T. MET
27 FM T. MET
26 MULTI PATH
10 MUT. AUTO OUT
25 FM S MET
17
15 STEREO IND
14 AUTO IN
5 AM +B OUT
6 AM +B IN
8 AM S.MET
9 AM OUT
21 FM OUT
22
23 DE-EM
24
11 +B
16
18 DE-EM
19 FM OUT
20 MUT IN
12 VCO KILLER
13 VCO T.P


Foil side
AWR-152, No.16
GWS-124, No.5
AWM-120, No.9
GWS-125, No.26
STEREO (PL5) IND.
GWS-125, No.21
GWS-125, No.20
GWS-125, No.22
GWS-125, No.18
AWT-001, No.1
AWT-001, No.9
Antenna terminal (AM)
T2
BLK
YEL
RED
L5 2.2μH
LPF
PA1001-A
HA1197
PA1002
PA3001-A
TA7302P
IS2473
2SK55
2SC1906
3SK45
VR1 100K
TUNING METER
AWT-001, No.3
AWT-001, No.4
AWT-001, No.18
AWT-001, No.2
AWT-001, No.14
AWT-001, No.12
AWT-001, No.13
GWS-125, No.23
GWS-125, No.25
GWS-125, No.28
GWS-125, No.30
AWT-001, No.16
75Ω
300Ω
GND
AM
Antenna terminal
T3
T2
1
2
3
4
5
6
A
B
C
D

Parts List of Tuner Assembly (AWE-092)

TRANSFORMER, COILS AND FILTERS

Symbol	Part No.	Description
T1	ATC-021	FM antenna coil
T2	ATC-015	FM RF coil
T3	ATC-016	FM RF coil
T4	ATC-057	FM RF coil
T5	ATE-039	FM matching coil
T6	ATE-030	FM detector transformer
T7	ATB-013	AM OSC coil
F1	ATF-018	FM ceramic filter
F2	ATF-018	FM ceramic filter
F3	ATF-018	FM ceramic filter
F4	ATF-018	FM ceramic filter
F5	ATF-047	Low pass filter
F6	ATF-038	455kHz filter
F7	ATF-034	AM ceramic filter
L1	T24-028	RF choke coil
L2	T24-028	RF choke coil
L3	ATH-014	Micro inductor
L4	T24-028	RF choke coil
L5	T24-028	RF choke coil

CAPACITORS

Symbol	Part No.	Description		
VC	ACK-022	Variable capacitor		
TC4	ACM-006	Ceramic trimmer		
C1	CCDTH 150K 50	Ceramic	15p	50V
C2	CCDSL 101K 50	Ceramic	100p	50V
C3	CKDYF 103Z 50	Ceramic	0.01	50V
C4	CCDSL 020C 50	Ceramic	2p	50V
C5	CKDYF 103Z 50	Ceramic	0.01	50V
C6	CKDYF 103Z 50	Ceramic	0.01	50V
C7	CCDTH 180K 50	Ceramic	18p	50V
C8	CCDTH 180K 50	Ceramic	18p	50V
C9	CCDSL 150K 50	Ceramic	15p	50V
C10	CCDSL 100F 50	Ceramic	10p	50V
C11	CKDYB 103K 50	Ceramic	0.01	50V
C12	CCDSL 101K 50	Ceramic	100p	50V
C13	CKDYB 103K 50	Ceramic	0.01	50V
C14	CCDLH 430K 50	Ceramic	43p	50V
C15	CCDCH 080F 50	Ceramic	8p	50V
C16	CCDCH 330K 50	Ceramic	33p	50V
C17	CCDCH 150K 50	Ceramic	15p	50V
C18	CKDYB 102K 50	Ceramic	1000p	50V
C19	CKDYF 403Z 50	Ceramic	0.04	50V
C20	CKDYA 332J 50	Ceramic	3300p	50V
C21	CKDYF 403Z 50	Ceramic	0.04	50V
C22	CCDSL 121K 50	Ceramic	120p	50V
C23	CKDBC 473Z 25	Ceramic	0.047	25V
C24	CKDBC 473Z 25	Ceramic	0.047	25V

Symbol	Part No.	Description		
C25	CKDYF 403Z 50	Ceramic	0.04	50V
C26	CCDSL 330K 50	Ceramic	33p	50V
C27	CSZA 0R1M 35	Electrolytic	0.1	35V
C28	CEA R47P 50	Electrolytic	0.47	50V
C29	CKDBC 473Z 25	Ceramic	0.047	25V
C30	CKDYF 403Z 50	Ceramic	0.04	50V
C31	CKDYF 403Z 50	Ceramic	0.04	50V
C32	CEA 010P 50	Electrolytic	1	50V
C33	CKDYF 103Z 50	Ceramic	0.01	50V
C34	CKDYF 103Z 50	Ceramic	0.04	50V
C35	CSZA 100M 16	Electrolytic	10	16V
C36	CEA 221P 16	Electrolytic	220	16V
C37	CEA 010P 50	Electrolytic	1	50V
C38	CSZA 010M 25	Electrolytic	0.1	25V
C39	CSZA 100M 16	Electrolytic	10	16V
C40	CSZA 6R8M6	Electrolytic	6.8	6V
C41	CQSH 511J 50	Styral	510p	50V
C42	CSZA 3R3M 16	Electrolytic	3.3	16V
C43	CSZA 3R3M 16	Electrolytic	3.3	16V
C44	CSZA R56K 35	Electrolytic	0.56	35V
C45	CSZA R56K 35	Electrolytic	0.56	35V
C46	CEA 470P 10	Electrolytic	47	10V
C47	CEA 470P 10	Electrolytic	47	10V
C48	ACE-019	Styrol	880p	
C49	CSZA 100M 16	Electrolytic	10	16V
C50	CKDYF 103Z 50	Ceramic	0.01	50V
C51	CKDYF 403Z 50	Ceramic	0.04	50V
C52	CQSA 331J 50	Styrol	330p	50V
C53	CKDYF 103Z 50	Ceramic	0.01	50V
C54	CCDXL 080F 50	Ceramic	8p	50V
C55	CKDYF 103Z 50	Ceramic	0.01	50V
C56	CKDYF 403Z 50	Ceramic	0.04	50V
C57	CKDYF 103Z 50	Ceramic	0.01	50V
C58	CKDYB 102K 50	Ceramic	1000p	50V
C59	CKDYF 403Z 50	Ceramic	0.04	50V
C60	CKDYB 821K 50	Ceramic	820p	50V
C61	CEA 3R3P 50	Electrolytic	3.3	50V
C62	CEA 4R7P 35	Electrolytic	4.7	35V
C63	CKDYB 122K 50	Ceramic	1200p	50V
C64	CQMA 333J 50	Mylar	0.033	50V
C65	CQMA 683J 50	Mylar	0.068	50V
C66	CKDYF 403Z 50	Ceramic	0.04	50V
C67	CEA 100P 16	Electrolytic	10	16V
C68	CCDSL 151K 50	Ceramic	150p	50V
C69	CCDSL 151K 50	Ceramic	150p	50V
C70	CSZA 4R7M 16	Electrolytic	4.7	16V
C71	CKDYB 821K 50	Ceramic	820p	50V
C72	CKDYB 561K 50	Ceramic	560p	50V
C73	CSZA 100M 16	Electrolytic	10	16V

Symbol	Part No.	Description		
C74	ACE-019	Styrol	880p	
C75	CKDYB 561K 50	Ceramic	560p	50V
C76	CSZA 4R7M 16	Electrolytic	4.7	16V
C77	CKDYB 821K 50	Ceramic	820p	50V
C78	CEA 221P16	Electrolytic	220	16V
C79	CEA 330P 16	Electrolytic	33	16V
C80	CQMA 473K 50	Mylar	0.047	50V
C81	CEA 101P 16	Electrolytic	100	16V
C82	CKDYF 403Z 50	Ceramic	0.04	50V
C83	CEA 101P 6	Electrolytic	100	6V
C84	CKDYB 821K 50	Ceramic	820p	50V
C85	CKDYF 403Z 50	Ceramic	0.04	50V

RESISTORS

Symbol	Part No.	Description		
VR1	C92-047	Semi fixed	100k	
VR2	C92-048	Semi fixed	47k	
VR3	C92-051	Semi fixed	4.7k	
VR4	ACP-057	Semi fixed	150k	
VR5	ACP-056	Semi fixed	22k	
R1	RD¼PS 105J	Carbon film	1M	
R2	RD¼VS 182J	Carbon film	1.8k	
R3	RD¼PS 562J	Carbon film	5.6k	
R4	RD¼VS 270J	Carbon film	27	
R5	RD¼VS 151J	Carbon film	150	
R6	RD¼VS 224J	Carbon film	220k	
R7	RD¼PS 123J	Carbon film	12k	
R8	RD¼PS 151J	Carbon film	150	
R9	RD¼PS 220J	Carbon film	22	
R10	RD½PS 121J	Carbon film	120	½W
R11	RD¼VS 103J	Carbon film	10k	
R12	RD¼VS 472J	Carbon film	4.7k	
R13	RD¼PS 102J	Carbon film	1k	
R14	RD½PS 121J	Carbon film	120	½W
R15	RD¼PS 101J	Carbon film	100	
R16	RD¼PS 331J	Carbon film	330	
R17	RD¼VS 560J	Carbon film	56	
R18	RD¼VS 560J	Carbon film	56	
R19	RD¼VS 102J	Carbon film	1k	
R20	RD¼PS 331J	Carbon film	330	
R21	RD¼PS 304J	Carbon film	300k	
R22	RD¼PS 331J	Carbon film	330	
R23	RD¼PS 621J	Carbon film	620	
R24	RD¼PS 621J	Carbon film	620	
R25	RD¼PS 822J	Carbon film	8.2	
R26	RD¼PS 511J	Carbon film	510	
R27	RD¼PS 242J	Carbon film	2.4k	
R28	RD¼PS 163J	Carbon film	16k	
R29	RD¼PS 222J	Carbon film	2.2k	
R30	RD¼PS 102J	Carbon film	1k	
R31	RD¼PS 822J	Carbon film	8.2k	
R32	RD¼PS 151J	Carbon film	150	
R33	RD¼PS 332J	Carbon film	3.3k	
R34	RD¼PS 332J	Carbon film	3.3k	
R35	RD¼PS 152J	Carbon film	1.5k	
R36	RD¼PS 152J	Carbon film	1.5k	
R37	RD½PS 161J	Carbon film	160	½W
R38	RD¼PS 822J	Carbon film	8.2k	
R39	RD¼PS 182J	Carbon film	1.8k	
R40	RD¼PS 104J	Carbon film	100k	
R41	RD¼PS 473J	Carbon film	47k	
R42	RN⅕SQ 1502F	Metal film	15k	⅕W
R43	RD¼VS 105J	Carbon film	1M	
R44	RD¼PS 104J	Carbon film	100k	
R45	RD¼PS 751J	Carbon film	750	
R46	RD¼PS 332J	Carbon film	3.3k	
R47	RD¼PS 332J	Carbon film	3.3k	
R48	RD¼PS 471J	Carbon film	470	
R49	RD¼PS 471J	Carbon film	470	
R50	RD¼PS 303J	Carbon film	30k	
R51	RD¼PS 303J	Carbon film	30k	
R52	RD¼PS 104J	Carbon film	100k	
R53	RD¼PS 222J	Carbon film	2.2k	
R54	RD¼PS 104J	Carbon film	100k	
R55	RD¼PS 303J	Carbon film	30k	
R56	RD¼PS 303J	Carbon film	30k	
R57	RD¼PS 222J	Carbon film	2.2k	
R58	RD¼PS 222J	Carbon film	2.2k	
R59	RD¼PS 752J	Carbon film	7.5k	
R60	RD¼PS 822J	Carbon film	8.2k	
R61	RD¼PS 752J	Carbon film	7.5k	
R62	RD¼PS 151J	Carbon film	150	
R63	RD¼PS 562J	Carbon film	5.6k	
R64	RD¼PS 152J	Carbon film	1.5k	
R65	RD¼PS 201J	Carbon film	200	
R66	RD¼PS 181J	Carbon film	180	
R67	RD¼PS 103J	Carbon film	10k	
R68	RD¼PS 103J	Carbon film	10k	
R69	RD¼PS 222J	Carbon film	2.2k	
R70	RD¼PS 102J	Carbon film	1k	
R71	RD¼VS 560J	Carbon film	56	
R72	RD¼VS 560J	Carbon film	56	

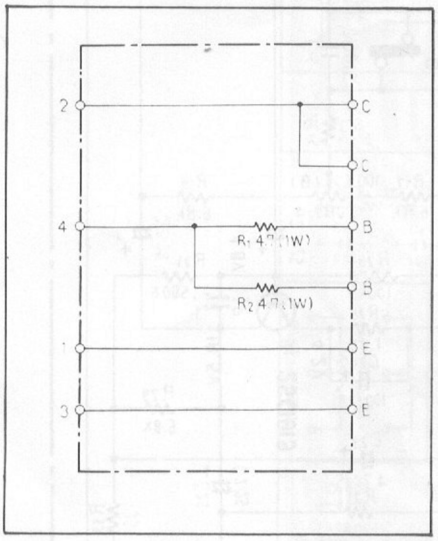
SEMICONDUCTORS

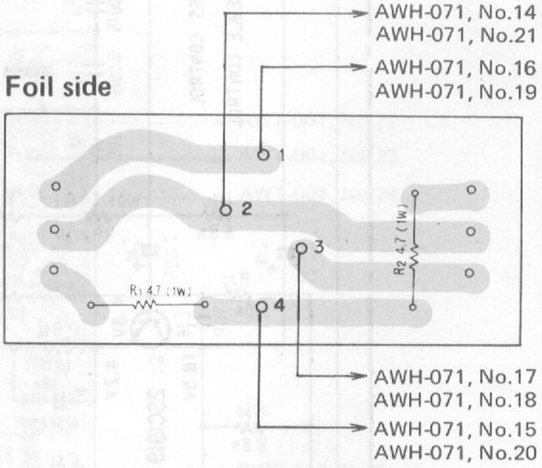
Symbol	Part No.	Description
Q1	3SK45-B	FET
Q2	3SK45-B	FET
Q3	2SC1906	Transistor
Q4	TA 7302P	IC
Q5	PA3001-A	IC
Q6	PA 1001-A	IC
Q7	PA 1002-A	IC
Q8	HA1197	IC
Q9	2SK55-D	FET
D1	1S2473	Diode

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

12.4 POWER TRANSISTOR CONNECTOR ASSEMBLY (AWX-125)


2
4
1
3
C
C
B
B
E
E
R1 4.7 (1W)
R2 4.7 (1W)

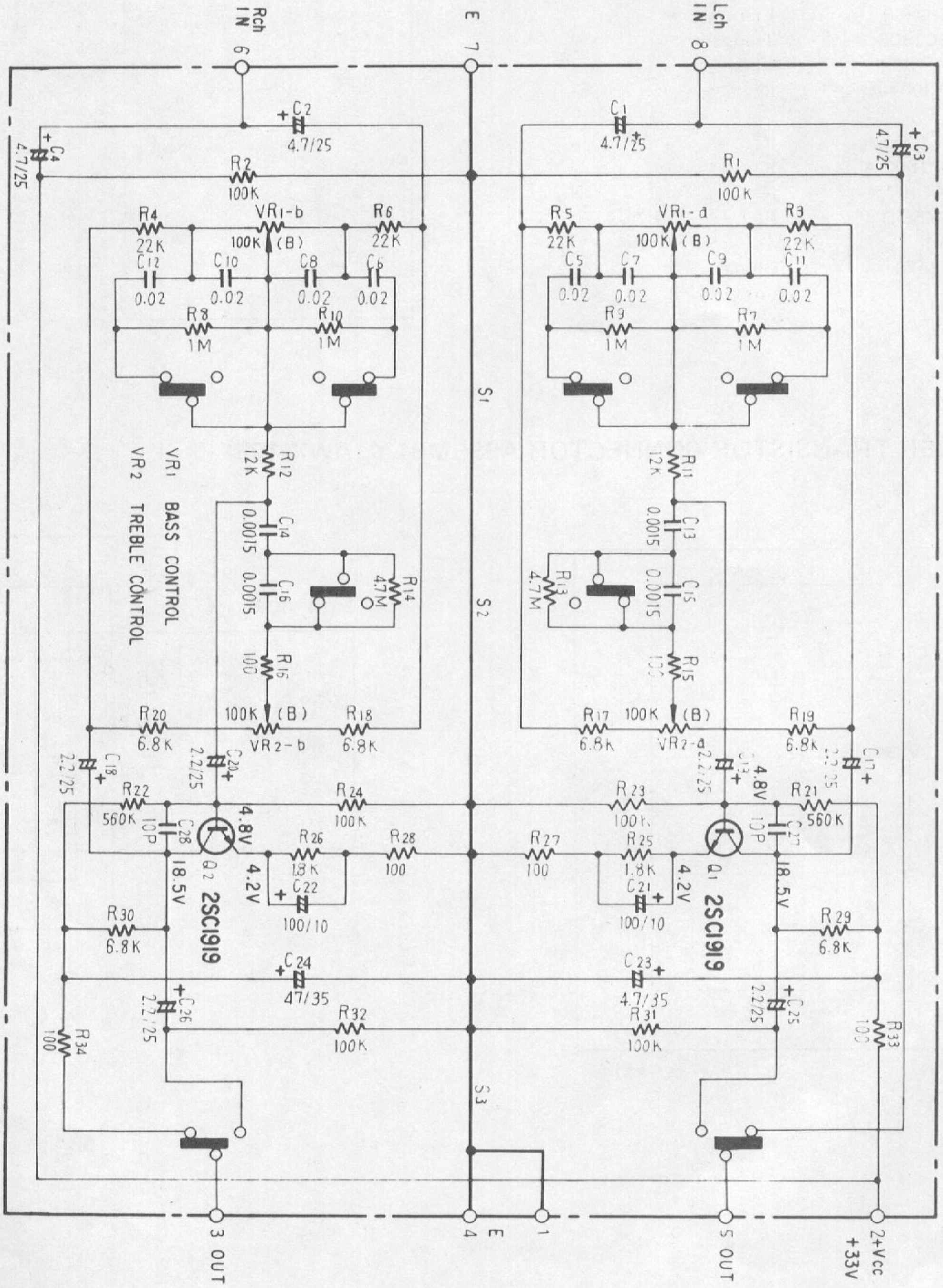

Foil side
AWH-071, No.14
AWH-071, No.21
AWH-071, No.16
AWH-071, No.19
1
2
3
4
R1 4.7 (1W)
R2 4.7 (1W)
AWH-071, No.17
AWH-071, No.18
AWH-071, No.15
AWH-071, No.20

Parts List

RESISTORS

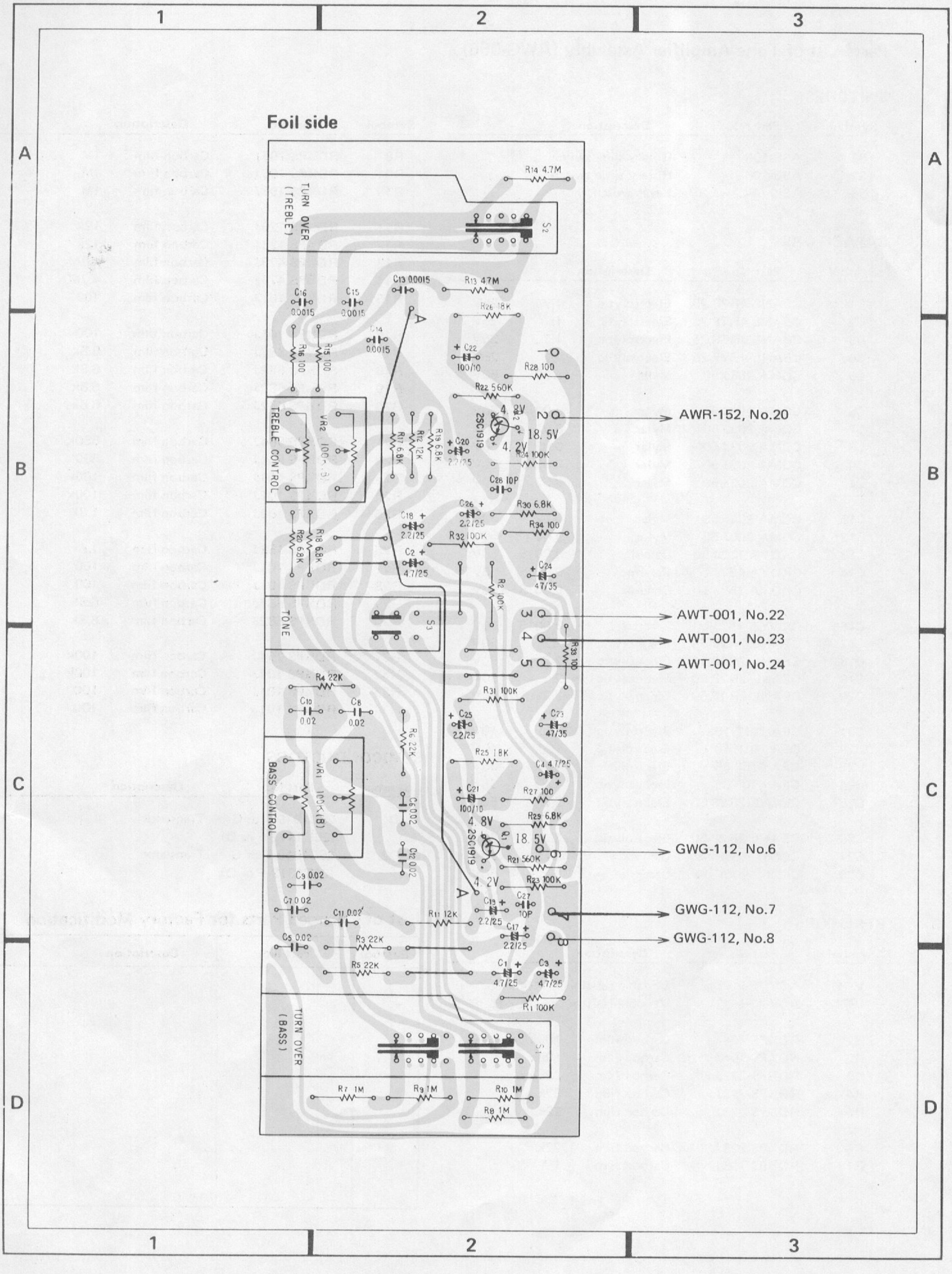
Symbol	Part No.	Description		
R1	RN1H 4R7J	Metal film	4.7	1W
R2	RN1H 4R7J	Metal film	4.7	1W

12.5 TONE CONTROL ASSEMBLY (AWG-056)



Rch IN 6
E 7
Lch IN 8
C2 4.7/25
C1 4.7/25
C4 4.7/25
C3 4.7/25
R2 100K
R1 100K
R4 22K
VR1-b 100K (B)
R6 22K
R5 22K
VR1-a 100K (B)
R3 22K
C12 0.02
C10 0.02
C8 0.02
C6 0.02
C5 0.02
C7 0.02
C9 0.02
C11 0.02
R8 1M
R10 1M
R9 1M
R7 1M
S1
S2
S3
R12 12K
R11 12K
C14 0.0015
C13 0.0015
C16 0.0015
C15 0.0015
R14 4.7M
R13 4.7M
R16 100
R15 100
VR1 BASS CONTROL
VR2 TREBLE CONTROL
R20 6.8K
VR2-b 100K (B)
R18 6.8K
R17 6.8K
VR2-a 100K (B)
R19 6.8K
C18 2.2/25
C20 2.2/25
C19 2.2/25
C17 2.2/25
R22 560K
C28 10P
R24 100K
R23 100K
C27 10P
R21 560K
4.8V
4.2V
18.5V
Q2 2SC1919
Q1 2SC1919
R26 1.8K
R28 100
R27 100
R25 1.8K
C22 100/10
C21 100/10
R30 6.8K
R29 6.8K
C24 47/35
C23 4.7/35
C26 2.2/25
C25 2.2/25
R34 100
R32 100K
R31 100K
R33 100
3 OUT
4 E
1
5 OUT
2 +Vcc +33V

Foil side


1
2
3
A
B
C
D
TURN OVER (TREBLE)
S2
R14 4.7M
C13 0.0015
R13 4.7M
C16 0.0015
C15 0.0015
C14 0.0015
R26 18K
A
C22 100/10
R28 100
R16 100
R15 100
R22 560K
TREBLE CONTROL
VR2 100K(B)
4.8V
2
AWR-152, No.20
2SC1919
Q2
18.5V
R17 6.8K
R12 12K
R19 6.8K
C20 2.2/25
4.2V
R24 100K
C28 10P
C18 2.2/25
C26 2.2/25
R30 6.8K
R34 100
R20 6.8K
R18 6.8K
R32 100K
C2 4.7/25
C24 47/35
R2 100K
TONE
S3
3
AWT-001, No.22
4
AWT-001, No.23
R33 100
5
AWT-001, No.24
R4 22K
C10 0.02
C8 0.02
R31 100K
C25 2.2/25
C23 47/35
R6 22K
R25 18K
C4 4.7/25
BASS CONTROL
VR1 100K(B)
C21 100/10
R27 100
C6 0.02
R29 6.8K
4.8V
2SC1919
Q1
18.5V
6
GWG-112, No.6
C12 0.02
R21 560K
C9 0.02
4.2V
R23 100K
A
C7 0.02
C19 2.2/25
C27 10P
C11 0.02
R11 12K
7
GWG-112, No.7
C5 0.02
R3 22K
C17 2.2/25
8
GWG-112, No.8
R5 22K
C1 4.7/25
C3 4.7/25
R1 100K
TURN OVER (BASS)
S1
R7 1M
R9 1M
R10 1M
R8 1M

Parts List of Tone Amplifier Assembly (AWG-056)

SWITCHES

Symbol	Part No.	Description
S1	ASE-105	Rotary slide switch
S2	ASE-106	Rotary slide switch
S3	ASK-144	Lever switch

CAPACITORS

Symbol	Part No.	Description		
C1	CEANL 4R7P 25	Electrolytic	4.7	25V
C2	CEANL 4R7P 25	Electrolytic	4.7	25V
C3	CEANL 4R7P 25	Electrolytic	4.7	25V
C4	CEANL 4R7P 25	Electrolytic	4.7	25V
C5	CQMA 203J 50	Mylar	0.02	50V
C6	CQMA 203J 50	Mylar	0.02	50V
C7	CQMA 203J 50	Mylar	0.02	50V
C8	CQMA 203J 50	Mylar	0.02	50V
C9	CQMA 203J 50	Mylar	0.02	50V
C10	CQMA 203J 50	Mylar	0.02	50V
C11	CQMA 203J 50	Mylar	0.02	50V
C12	CQMA 203J 50	Mylar	0.02	50V
C13	CKDYA 152J 50	Ceramic	0.0015	50V
C14	CKDYA 152J 50	Ceramic	0.0015	50V
C15	CKDYA 152J 50	Ceramic	0.0015	50V
C16	CKDYA 152J 50	Ceramic	0.0015	50V
C17	CEANL 2R2P 50	Electrolytic	2.2	50V
C18	CEANL 2R2P 50	Electrolytic	2.2	50V
C19	CEANL 2R2P 50	Electrolytic	2.2	50V
C20	CEANL 2R2P 50	Electrolytic	2.2	50V
C21	CEA 101P 10	Electrolytic	100	10V
C22	CEA 101P 10	Electrolytic	100	10V
C23	CEA 470P 35	Electrolytic	47	35V
C24	CEA 470P 35	Electrolytic	47	35V
C25	CEANL 2R2P 50	Electrolytic	2.2	50V
C26	CEANL 2R2P 50	Electrolytic	2.2	50V
C27	CCDSL 100F 50	Ceramic	10p	50V
C28	CCDSL 100F 50	Ceramic	10p	50V

RESISTORS

Symbol	Part No.	Description	
VR1	ACV-136	Variable resistor	100k-B
VR2	ACV-136	Variable resistor	100k-B
R1	RD¼PS 104J	Carbon film	100k
R2	RD¼PS 104J	Carbon film	100k
R3	RD¼PS 223J	Carbon film	22k
R4	RD¼PS 223J	Carbon film	22k
R5	RD¼PS 223J	Carbon film	22k
R6	RD¼PS 223J	Carbon film	22k
R7	RD¼PS 105J	Carbon film	1M
R8	RD¼PS 105J	Carbon film	1M
R9	RD¼PS 105J	Carbon film	1M
R10	RD¼PS 105J	Carbon film	1M
R11	RD¼PS 123J	Carbon film	12k
R12	RD¼PS 123J	Carbon film	12k
R13	RD¼PS 475J	Carbon film	4.7M
R14	RD¼PS 475J	Carbon film	4.7M
R15	RD¼PS 101J	Carbon film	100
R16	RD¼PS 101J	Carbon film	100
R17	RD¼PS 682J	Carbon film	6.8k
R18	RD¼PS 682J	Carbon film	6.8k
R19	RD¼PS 682J	Carbon film	6.8k
R20	RD¼PS 682J	Carbon film	6.8k
R21	RD¼PS 564J	Carbon film	560k
R22	RD¼PS 564J	Carbon film	560k
R23	RD¼PS 104J	Carbon film	100k
R24	RD¼PS 104J	Carbon film	100k
R25	RD¼PS 182J	Carbon film	1.8k
R26	RD¼PS 182J	Carbon film	1.8k
R27	RD¼PS 101J	Carbon film	100
R28	RD¼PS 101J	Carbon film	100
R29	RD¼PS 682J	Carbon film	6.8k
R30	RD¼PS 682J	Carbon film	6.8k
R31	RD¼PS 104J	Carbon film	100k
R32	RD¼PS 104J	Carbon film	100k
R33	RD¼PS 101J	Carbon film	100
R34	RD¼PS 101J	Carbon film	100

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SC1919-F or G (2SC1312-F or Q)	Transistor
Q2	2SC1919-F or G (2SC1312-F or Q)	Transistor

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

12.6 FLAT AMPLIFIER ASSEMBLY (GWG-112)

Parts List

SWITCHES

Symbol	Part No.	Description
S1	ASK-145	Lever switch
S2	ASK-144	Lever switch
S3	ASK-144	Lever switch
S4	ASK-144	Lever switch
S5	ASK-144	Lever switch
S6	ASK-144	Lever switch

CAPACITORS

Symbol	Part No.	Description		
C1	CCDSL 151K 50	Ceramic	150p	50V
C2	CCDSL 151K 50	Ceramic	150p	50V
C3	CSZA 0R1M 35	Electrolytic	0.1	35V
C4	CSZA 0R1M 35	Electrolytic	0.1	35V
C5	CSZA 010M 25	Electrolytic	1	25V
C6	CSZA 010M 25	Electrolytic	1	25V
C7	CCDSL 560K 50	Ceramic	56p	50V
C8	CCDSL 560K 50	Ceramic	56p	50V
C9	CCDSL 680K 50	Ceramic	68p	50V
C10	CCDSL 680K 50	Ceramic	68p	50V
C11	CCDSL 100F 50	Ceramic	10p	50V
C12	CCDSL 100F 50	Ceramic	10p	50V
C13	CEANL 101P 10	Electrolytic	100	10V
C14	CEANL 101P 10	Electrolytic	100	10V
C15	CEANL 101P 10	Electrolytic	100	10V
C16	CEANL 101P 10	Electrolytic	100	10V
C17	CEA 101P 25	Electrolytic	100	25V
C18	CEA 101P 25	Electrolytic	100	25V
C19	CEANL 4R7P 25	Electrolytic	4.7	25V
C20	CEANL 4R7P 25	Electrolytic	4.7	25V

RESISTORS

Symbol	Part No.	Description	
VR1	ACV-162	Variable resistor	100k
VR2	ACV-190	Variable resistor	250k
R5	RD¼PS 472J	Carbon film	4.7k
R6	RD¼PS 472J	Carbon film	4.7k
R7	RD¼PS 473J	Carbon film	47k
R8	RD¼PS 473J	Carbon film	47k
R9	RD¼PS 622J	Carbon film	6.2k
R10	RD¼PS 622J	Carbon film	6.2k
R11	RD¼PS 622J	Carbon film	6.2k
R12	RD¼PS 622J	Carbon film	6.2k
R13	RD¼PS 683J	Carbon film	68k
R14	RD¼PS 683J	Carbon film	68k
R15	RD¼PS 101J	Carbon film	100
R16	RD¼PS 101J	Carbon film	100
R17	RD¼PS 223J	Carbon film	22k
R18	RD¼PS 223J	Carbon film	22k
R19	RD¼PS 134J	Carbon film	130k
R20	RD¼PS 134J	Carbon film	130k
R21	RD¼PS 753J	Carbon film	75k
R22	RD¼PS 753J	Carbon film	75k
R23	RD¼PS 122J	Carbon film	1.2k
R24	RD¼PS 122J	Carbon film	1.2k
R25	RD¼PS 822J	Carbon film	8.2k
R26	RD¼PS 822J	Carbon film	8.2k
R27	RD¼PS 392J	Carbon film	3.9k
R28	RD¼PS 392J	Carbon film	3.9k
R29	RD¼PS 103J	Carbon film	10k
R30	RD¼PS 103J	Carbon film	10k
R31	RD¼PS 101J	Carbon film	100
R32	RD¼PS 101J	Carbon film	100

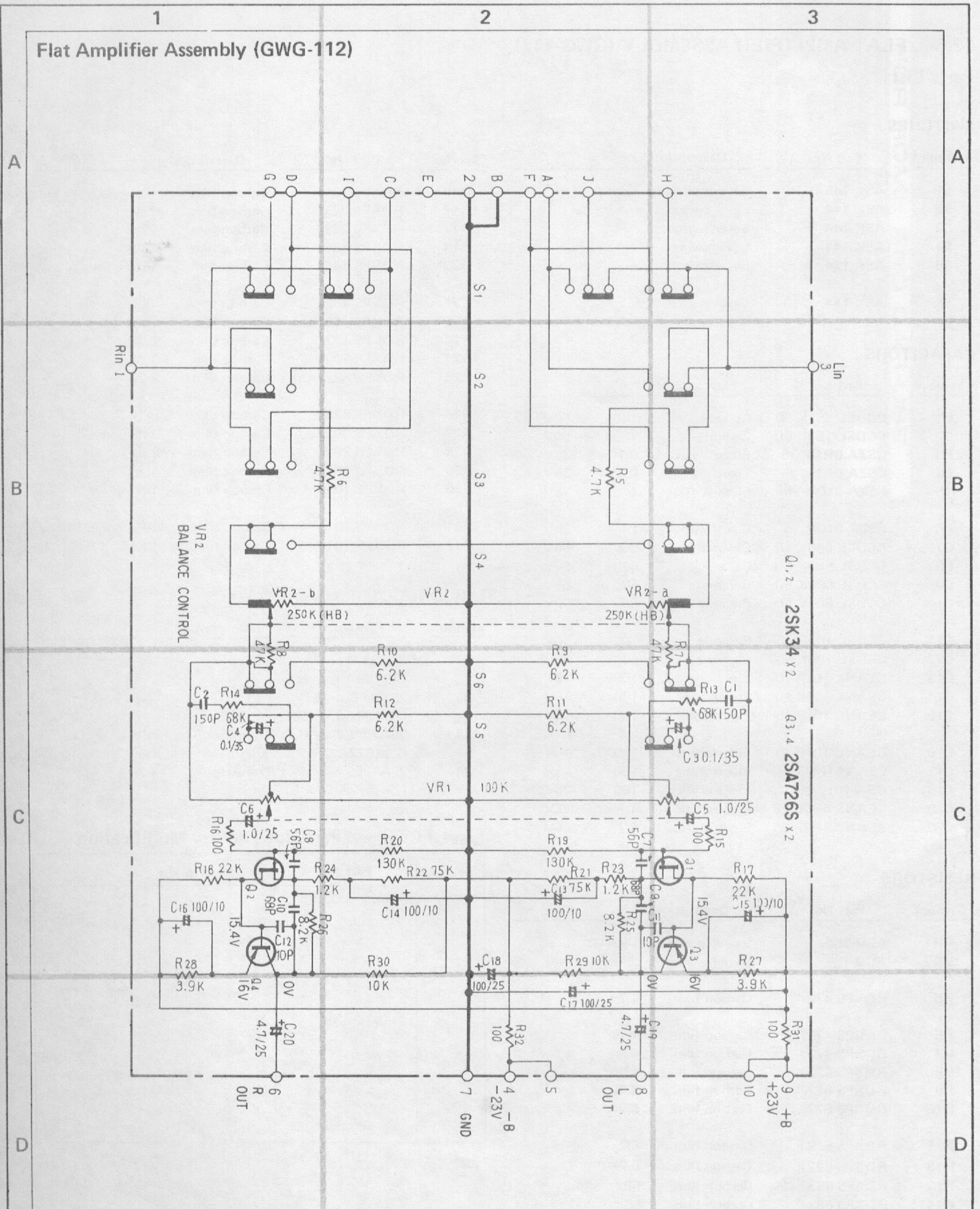
SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SK34-C or D (2SK68A-L or M)	FET
Q2	2SK34-C or D (2SK68A-L or M)	FET
Q3	2SA726S-F or G (2SA872A-D or E)	Transistor
Q4	2SA726S-F or G (2SA872A-D or E)	Transistor

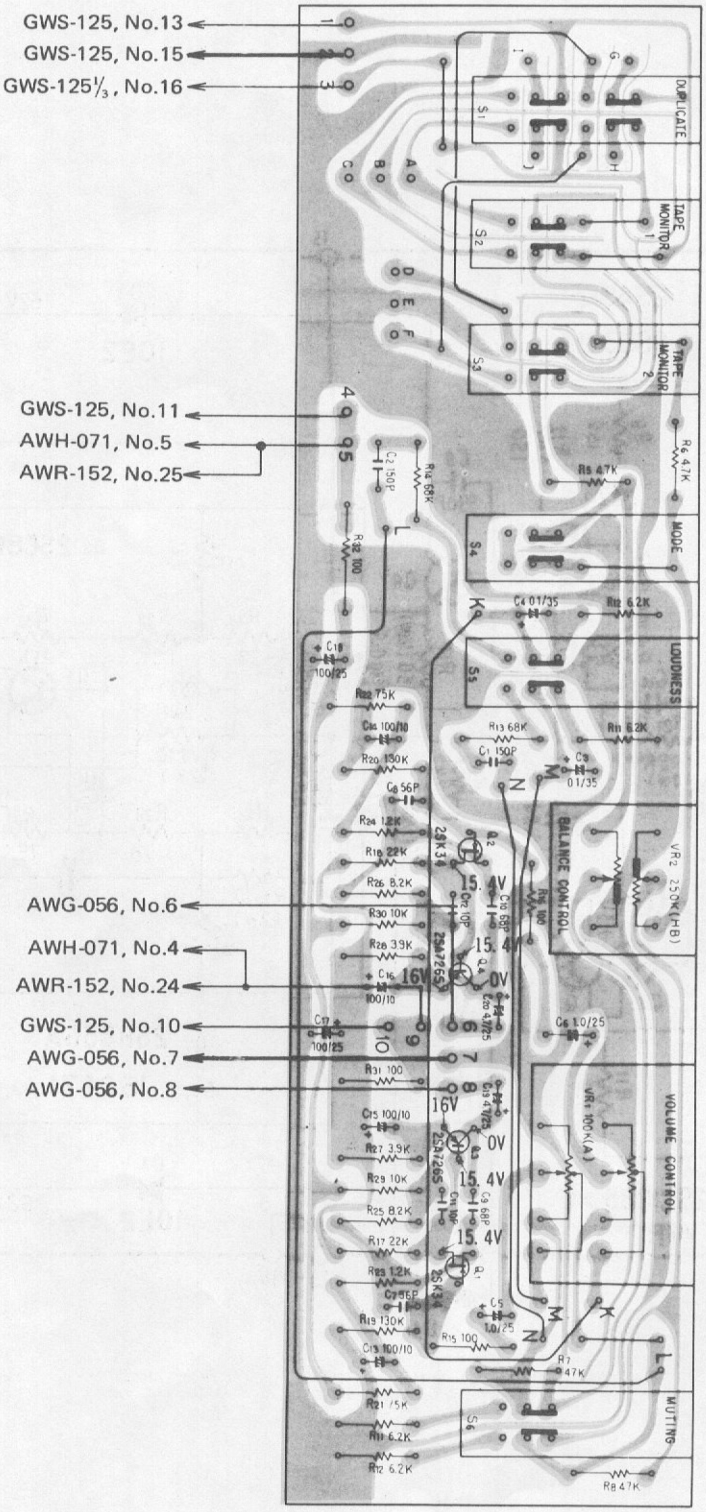
List of Changed Parts for Factory Modification

Symbol	Part No.	Description

Flat Amplifier Assembly (GWG-112)


1
2
3
A
B
C
D
G
D
I
C
E
2
B
F
A
J
H
Rin 1
Lin 3
S1
S2
S3
S4
S5
S6
R6 4.7K
R5 4.7K
VR2 BALANCE CONTROL
VR2-b
250K(HB)
VR2
VR2-a
250K(HB)
R8 47K
R7 47K
R10 6.2K
R9 6.2K
R12 6.2K
R11 6.2K
C2 150P
R14 68K
C4 0.1/35
R13 68K
C1 150P
C3 0.1/35
VR1 100K
C6 1.0/25
C5 1.0/25
R16 100
R15 100
C8 56P
C7 56P
R20 130K
R19 130K
R18 22K
R24 1.2K
R22 75K
R21 75K
R23 1.2K
C9 68P
R17 22K
Q2
Q1
C16 100/10
C10 68P
C14 100/10
C13 100/10
C15 100/10
15.4V
R26 8.2K
R25 8.2K
C12 10P
C11 10P
R28 3.9K
Q4
16V
0V
R30 10K
C18 100/25
R29 10K
Q3
R27 3.9K
C17 100/25
C20 4.7/25
R32 100
C19 4.7/25
R31 100
6 R OUT
7 GND
4 -23V -B
5
8 L OUT
10
9 +23V +B
Q1, 2 2SK34 x2
Q3, 4 2SA726S x2

Foil side


GWS-125, No.13
GWS-125, No.15
GWS-125⅓, No.16
GWS-125, No.11
AWH-071, No.5
AWR-152, No.25
AWG-056, No.6
AWH-071, No.4
AWR-152, No.24
GWS-125, No.10
AWG-056, No.7
AWG-056, No.8
DUPLICATE
S1
TAPE MONITOR 1
S2
TAPE MONITOR 2
S3
MODE
S4
LOUDNESS
S5
BALANCE CONTROL
VR2 250K(HB)
VOLUME CONTROL
VR1 100K(A)
MUTING
S6
R5 4.7K
R6 4.7K
R14 68K
C2 150P
R32 100
C4 01/35
R12 6.2K
C18 100/25
R22 75K
C14 100/10
R13 68K
C1 150P
R11 6.2K
C3 01/35
R20 130K
C8 56P
R24 1.2K
R18 22K
R26 8.2K
R30 10K
R28 3.9K
C16 100/10
C17 100/25
C6 1.0/25
R31 100
C15 100/10
R27 3.9K
R29 10K
R25 8.2K
R17 22K
R23 1.2K
C7 56P
R19 130K
C13 100/10
R15 100
C5 1.0/25
R7 47K
R21 75K
R11 6.2K
R12 6.2K
R8 4.7K
2SK34
2SA726S
15.4V
16V
0V
A B C D E F G H I J K L M N

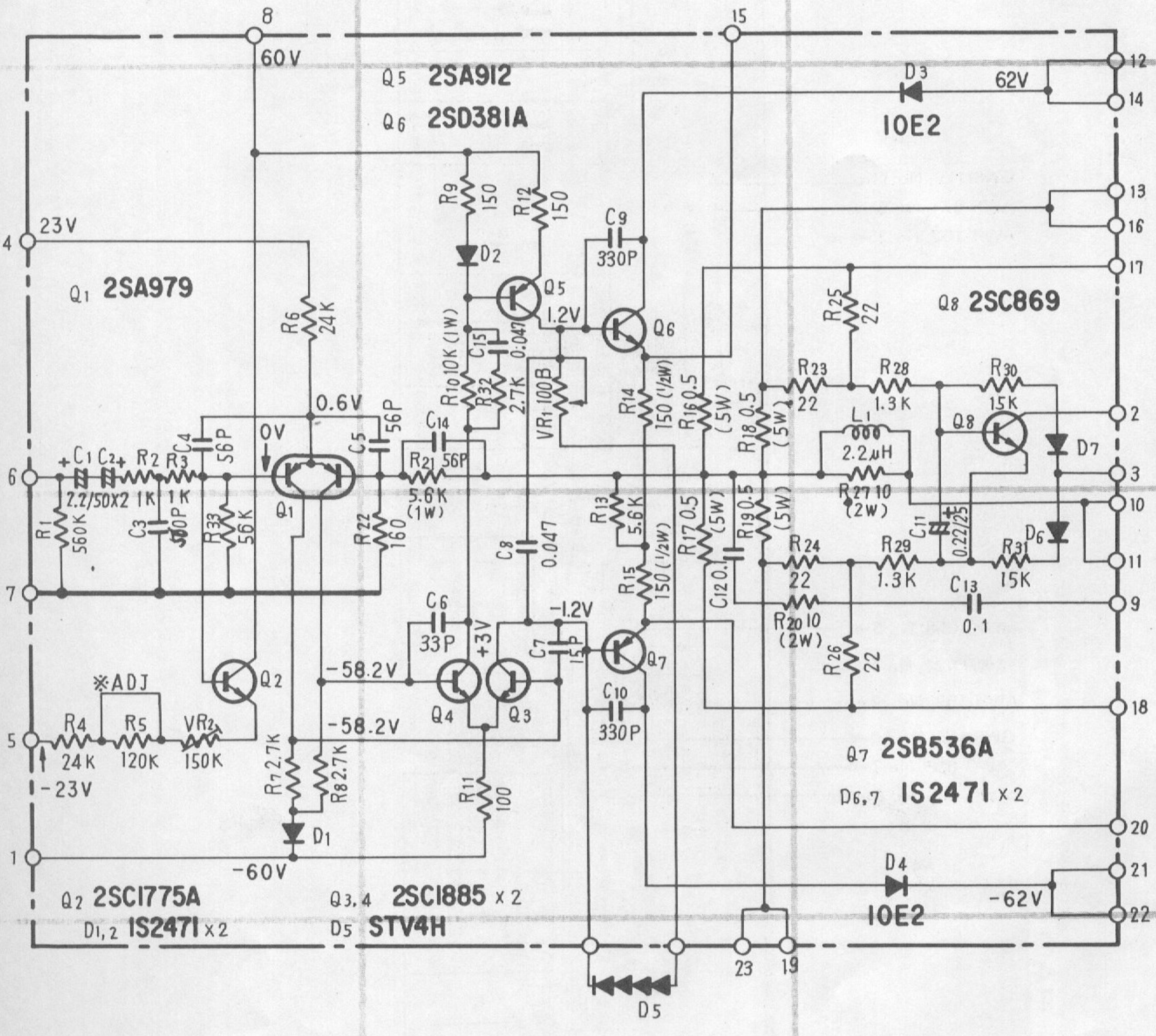
1 2 3

12.7 POWER AMPLIFIER ASSEMBLY (AWH-071)

A A

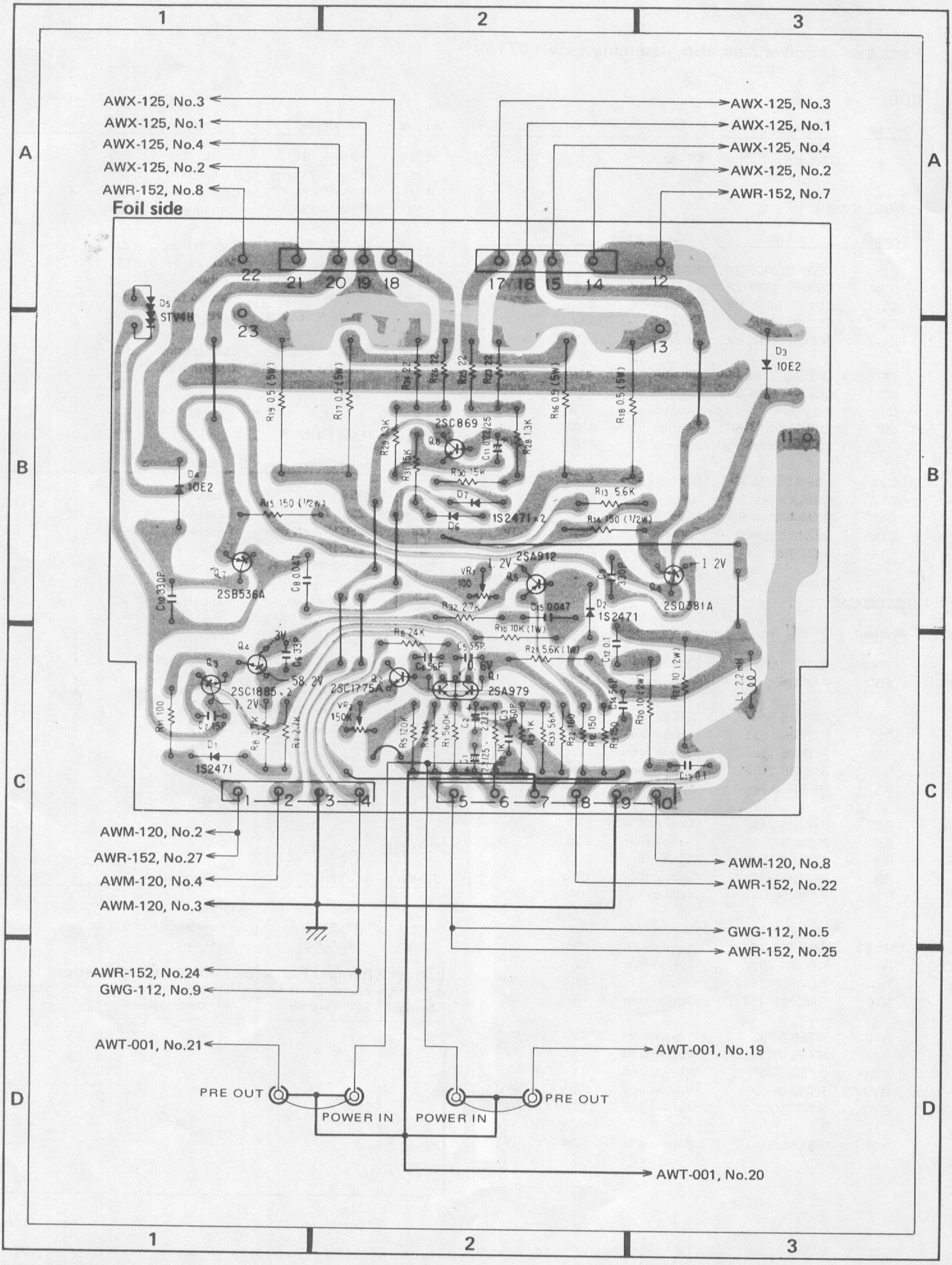
B B

C C


8
60V
15
Q5 2SA912
Q6 2SD381A
D3
62V
12
14
10E2
13
16
17
4
23V
Q1 2SA979
R6 24K
R9 150
R12 150
C9
330P
D2
Q5
1.2V
Q6
Q8 2SC869
R25 22
R10 10K (1W)
C15 0.047
R32 2.7K
VR1 100B
R14 150 (1/2W)
R16 0.5 (5W)
R18 0.5 (5W)
R23 22
R28 1.3K
R30 15K
Q8
2
D7
0.6V
C4 56P
0V
C5 56P
C14
R21 56P
5.6K (1W)
L1 2.2μH
R27 10 (2W)
3
10
6
C1 C2
2.2/50X2
R2 1K
R3 1K
R1 560K
C3 300P
R33 56K
Q1
R22 160
C8 0.047
R13 5.6K
R17 0.5 (5W)
R19 0.5 (5W)
C11 0.22/25
D6
R24 22
R29 1.3K
R31 15K
11
7
R15 150 (1/2W)
C12 0.1
R20 10 (2W)
C13 0.1
9
C6 33P
+3V
-1.2V
C7 15P
Q7
※ADJ
Q2
-58.2V
Q4
Q3
-58.2V
R26 22
C10 330P
18
C
5
R4 24K
R5 120K
VR2 150K
-23V
R7 2.7K
R8 2.7K
R11 100
Q7 2SB536A
D6,7 1S2471 x2
D1
20
1
-60V
D4
21
Q2 2SC1775A
D1,2 1S2471 x2
Q3,4 2SC1885 x2
D5 STV4H
10E2
-62V
22
23
19
D5

D D

1 2 3


Foil side
AWX-125, No.3
AWX-125, No.1
AWX-125, No.4
AWX-125, No.2
AWR-152, No.8
AWR-152, No.7
D5 STV4H
D3 10E2
D4 10E2
R19 0.5 (5W)
R17 0.5 (5W)
R16 0.5 (5W)
R18 0.5 (5W)
R24 22
R26 22
R25 22
R23 22
2SC869
Q8
R29 1.3K
R28 1.3K
R31 15K
C11 0.022/25
R30 15K
D7
D6
1S2471×2
R13 5.6K
R14 150 (1/2W)
R15 150 (1/2W)
Q7
2SB536A
C10 330P
C8 0.047
VR1 100
1.2V
2SA912
Q5
Q6
C9 330P
1.2V
2SD381A
R32 2.7K
C15 0.047
D2 1S2471
R10 10K (1W)
R21 5.6K (1W)
C12 0.1
R6 24K
C5 5.5P
C4 56P
0.6V
Q4
3V
C6 33P
58.2V
Q3
2SC1885×2
1.2V
Q2
2SC1775A
Q1
2SA979
VR2 150K
R11 100
C7 15P
R8 2.7K
R7 2.7K
D1
1S2471
R5 120K
R4 24K
R1 560K
C2 2.2/25
C1 2.2/25
R2 1K
C3 60P
R3 1K
R33 56K
R22 180
R12 150
R9 150
C14 56P
R20 10 (2W)
R27 10 (2W)
L1 2.2mH
C13 0.1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
AWM-120, No.2
AWR-152, No.27
AWM-120, No.4
AWM-120, No.3
AWM-120, No.8
AWR-152, No.22
GWG-112, No.5
AWR-152, No.25
AWR-152, No.24
GWG-112, No.9
AWT-001, No.21
AWT-001, No.19
AWT-001, No.20
PRE OUT
POWER IN
POWER IN
PRE OUT
1 2 3
A B C D

Parts List of Power Amplifier Assembly (AWH-071)

COIL

Symbol	Part No.	Description
L1	T63-009	AF choke coil

CAPACITORS

Symbol	Part No.	Description		
C1	CEANL 2R2P 25	Electrolytic	2.2	25V
C2	CEANL 2R2P 25	Electrolytic	2.2	25V
C3	CCDSL 561K 50	Ceramic	560p	50V
C4	CCDSL 560K 50	Ceramic	56p	50V
C5	CCDSL 560K 50	Ceramic	56p	50V
C6	CCDSL 330K 500	Ceramic	33p	500V
C7	CCDSL 150K 500	Ceramic	15p	500V
C8	ACG-009	Ceramic	0.047	150V
C9	CCDSL 331K 500	Ceramic	330p	500V
C10	CCDSL 331K 500	Ceramic	330p	500V
C11	CSSA R22M 25	Electrolytic	0.22	25V
C12	CQMA 104K 50	Mylar	0.1	50V
C13	CQMA 104K 50	Mylar	0.1	50V
C14	CCDSL 560K 50	Ceramic	56p	50V
C15	ACG-009	Ceramic	0.047	150V

RESISTORS

Symbol	Part No.	Description		
VR1	ACP-019	Semi fixed	100-B	
VR2	ACP-063	Semi fixed	150k	
R1	RD¼PS 564J	Carbon film	560k	
R2	RD¼PS 102J	Carbon film	1k	
R3	RD¼PS 102J	Carbon film	1k	
R4	RD¼PS 243J	Carbon film	24k	
R5	RD¼PS 124J	Carbon film	120k	
R6	RD¼PS 243J	Carbon film	24k	
R7	RD¼PS 272J	Carbon film	2.7k	
R8	RD¼PS 272J	Carbon film	2.7k	
R9	RD¼PSF 151J	Carbon film	150	
R10	RS1P 103J	Metal oxide	10k	1W
R11	RD¼PSF 101J	Carbon film	100	
R12	RD¼PSF 151J	Carbon film	150	
R13	RD¼PS 562J	Carbon film	5.6k	
R14	RD½PSF 151J	Carbon film	150	½W
R15	RD½PSF 151J	Carbon film	150	½W
R16	RT5B 0R5K	Wier wound	0.5	5W
R17	RT5B 0R5K	Wier wound	0.5	5W
R18	RT5B 0R5K	Wier wound	0.5	5W
R19	RT5B 0R5K	Wier wound	0.5	5W
R20	RS2P 100J	Metal oxide	10	2W
R21	RS1P 562J	Metal oxide	5.6k	1W
R22	RD¼PS 161J	Carbon film	160	
R23	RD¼PS 220J	Carbon film	22	
R24	RD¼PS 220J	Carbon film	22	
R25	RD¼PS 220J	Carbon film	22	
R26	RD¼PS 220J	Carbon film	22	
R27	RS2P 100J	Metal oxide	10	2W
R28	RD¼PSF 132J	Carbon film	1.3k	
R29	RD¼PSF 132J	Carbon film	1.3k	
R30	RD¼PS 153J	Carbon film	15k	
R31	RD¼PS 153J	Carbon film	15k	
R32	RD¼PS 272J	Carbon film	2.7k	
R33	RD¼PS 563J	Carbon film	56k	

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SA979-F	Transistor
Q2	2SC1775-E	Transistor
Q3	2SC1885-Q or R	Transistor
Q4	2SC1885-Q or R	Transistor
Q5	2SA912-Q or R	Transistor
Q6	2SD381A-M or L	Transistor
Q7	2SB536A-M or L	Transistor
Q8	2SC869-D or C	Transistor
D1	1S2471	Diode
D2	1S2471	Diode
D3	10EA or SIB01-02	Diode
D4	10EA or SIB01-02	Diode
D5	STV4H	Varistor
D6	1S2471	Diode
D7	1S2471	Diode

OTHERS

Symbol	Part No.	Description
	AKM-022	4P plug
	AEC-410	Transistor cover
	ANH-203	Heat sink

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

12.8 SPEAKER SELECTOR ASSEMBLY (GWS-124)

Parts List

SWITCH

Symbol	Part No.	Description
	ASG-133	Push switch

CAPACITORS

Symbol	Part No.	Description		
C1	CSZA 4R7M 6	Electrolytic	4.7	6V
C2	CEA 330P 10	Electrolytic	33	10V
C3	CSZA 4R7M 6	Electrolytic	4.7	6V
C4	CEA 330P 10	Electrolytic	33	10V
C5	CEA 101P 6	Electrolytic	100	6V

RESISTORS

Symbol	Part No.	Description		
VR1	ACP-006	Semi fixed	470	
VR2	ACP-006	Semi fixed	470	
R1	RS3P 151J	Metal oxide	150	3W
R2	RS3P 151J	Metal oxide	150	3W
R3	RD¼PS 562J	Carbon film	5.6k	
R4	RD¼PS 471J	Carbon film	470	
R5	RD¼PS 391J	Carbon film	390	
R6	RD¼PS 204J	Carbon film	200k	
R7	RD¼PS 303J	Carbon film	30k	
R8	RD¼PS 152J	Carbon film	1.5k	
R9	RD¼PS 562J	Carbon film	5.6k	
R10	RD¼PS 471J	Carbon film	470	
R11	RD¼PS 391J	Carbon film	390	
R12	RD¼PS 204J	Carbon film	200k	
R13	RD¼PS 303J	Carbon film	30k	
R14	RD¼PS 152J	Carbon film	1.5k	
R15	RD¼PS 222J	Carbon film	2.2k	

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SC1919-G or F (2SC1312-F or G)	Transistor
Q2	2SC1919-G or F (2SC1312-F or G)	Transistor
D1	1S2473 or 1S1555	Diode
D2	1S2473 or 1S1555	Diode
D3	1S2473 or 1S1555	Diode
D4	1S2473 or 1S1555	Diode
D5	1S2473 or 1S1555	Diode
D6	1S2473 or 1S1555	Diode
D7	1S2473 or 1S1555	Diode
D8	1S2473 or 1S1555	Diode
D9	1S2473 or 1S1555	Diode
D10	1S2473 or 1S1555	Diode
D11	1S2473 or 1S1555	Diode

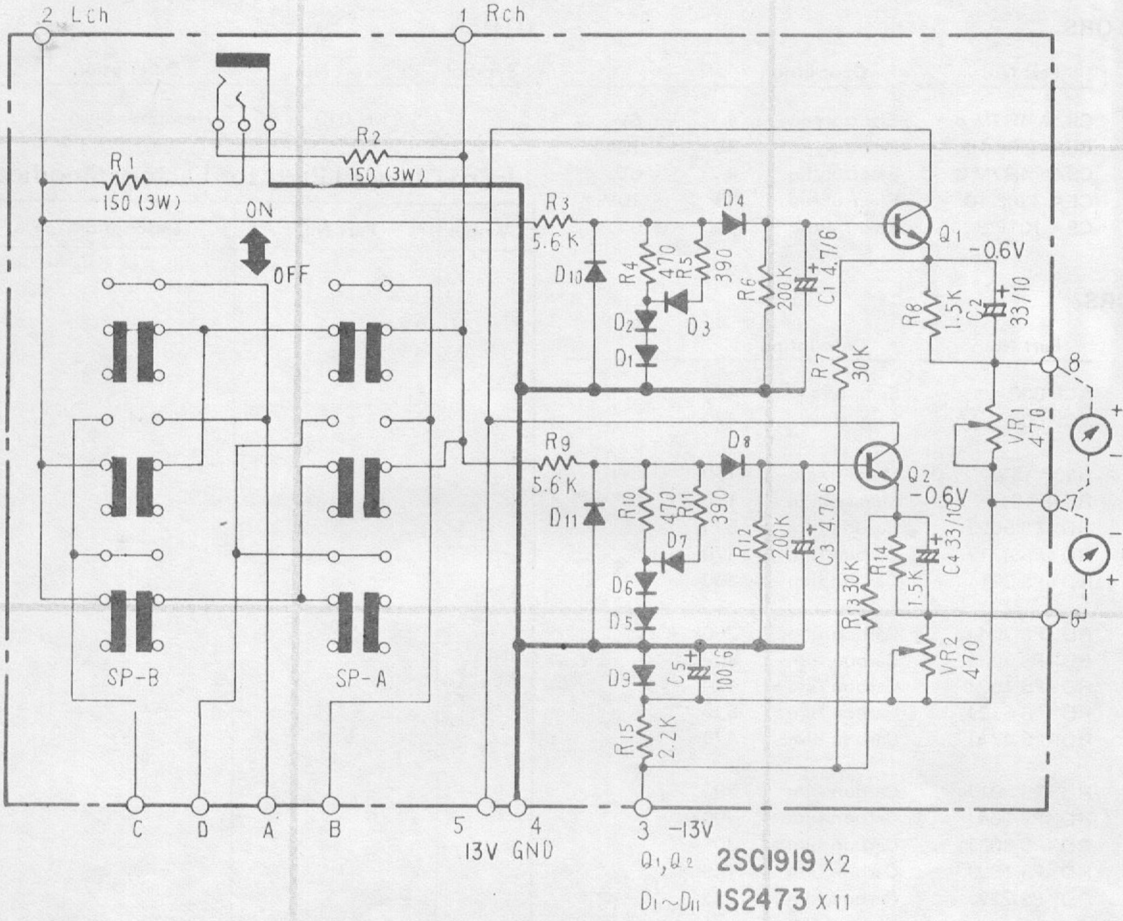
OTHER

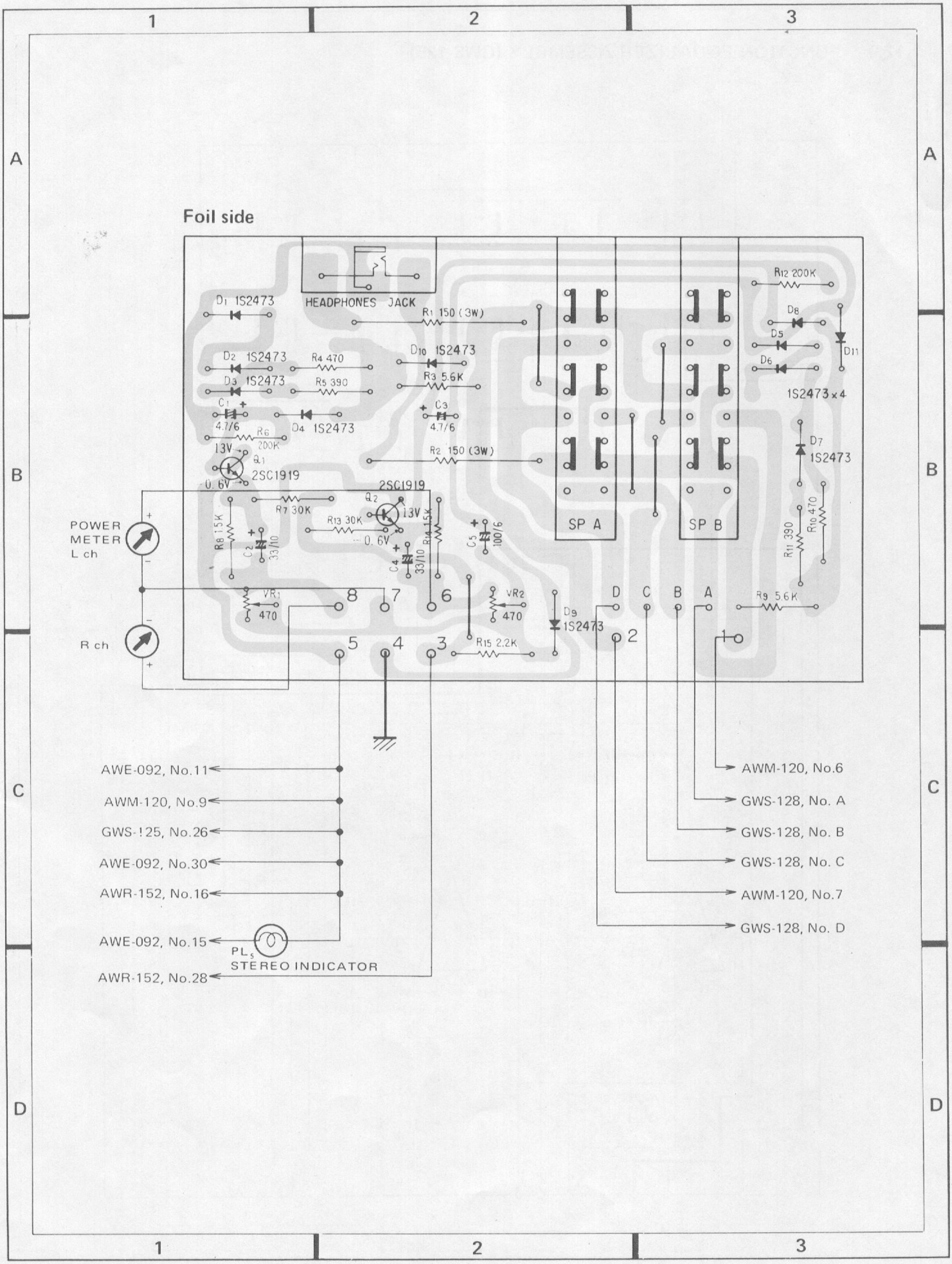
Symbol	Part No.	Description
	AKN-010	Headphone jack

List of Changed Parts for Factory Modification

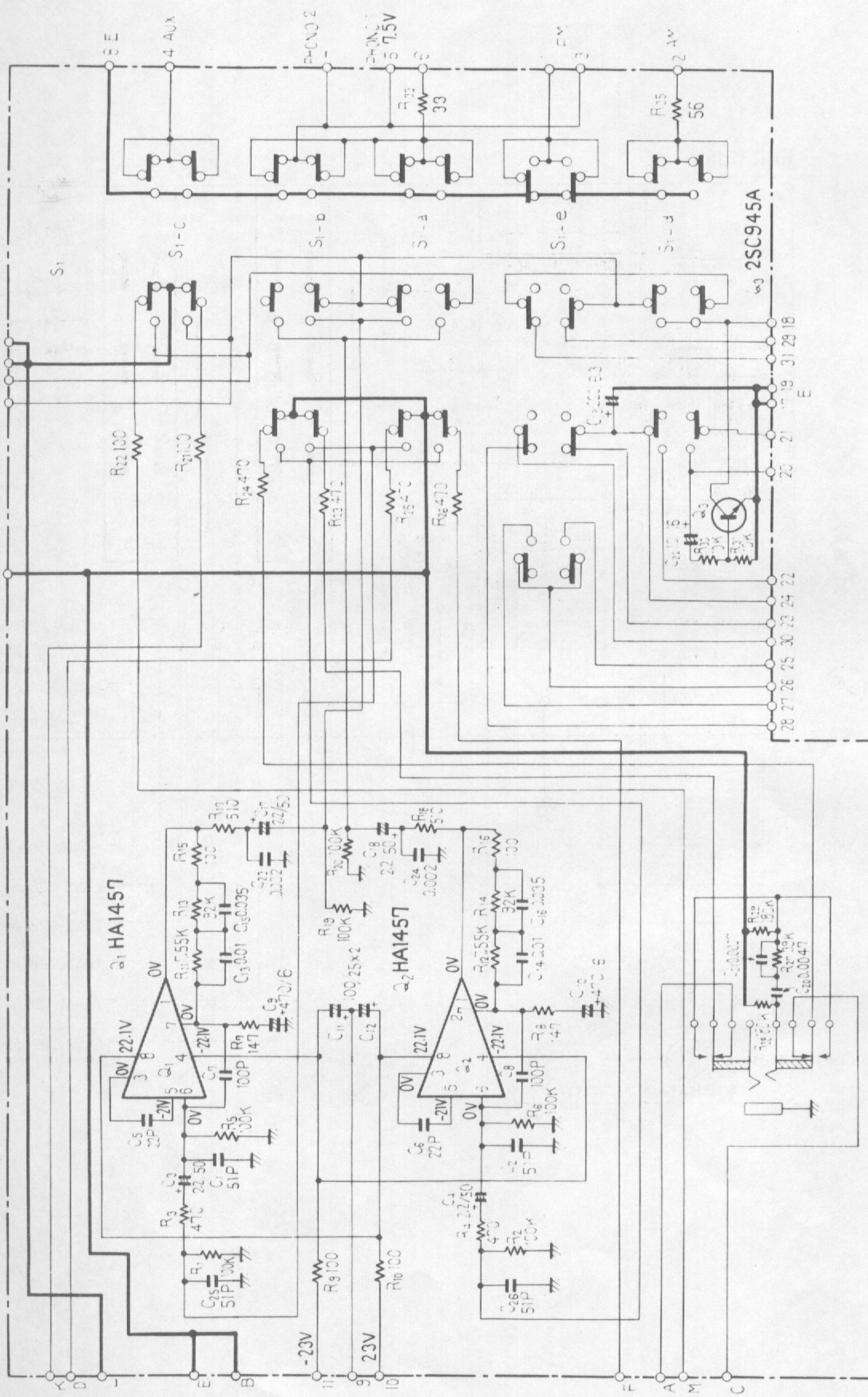
Symbol	Part No.	Description

Speaker Selector Assembly (GWS-124)

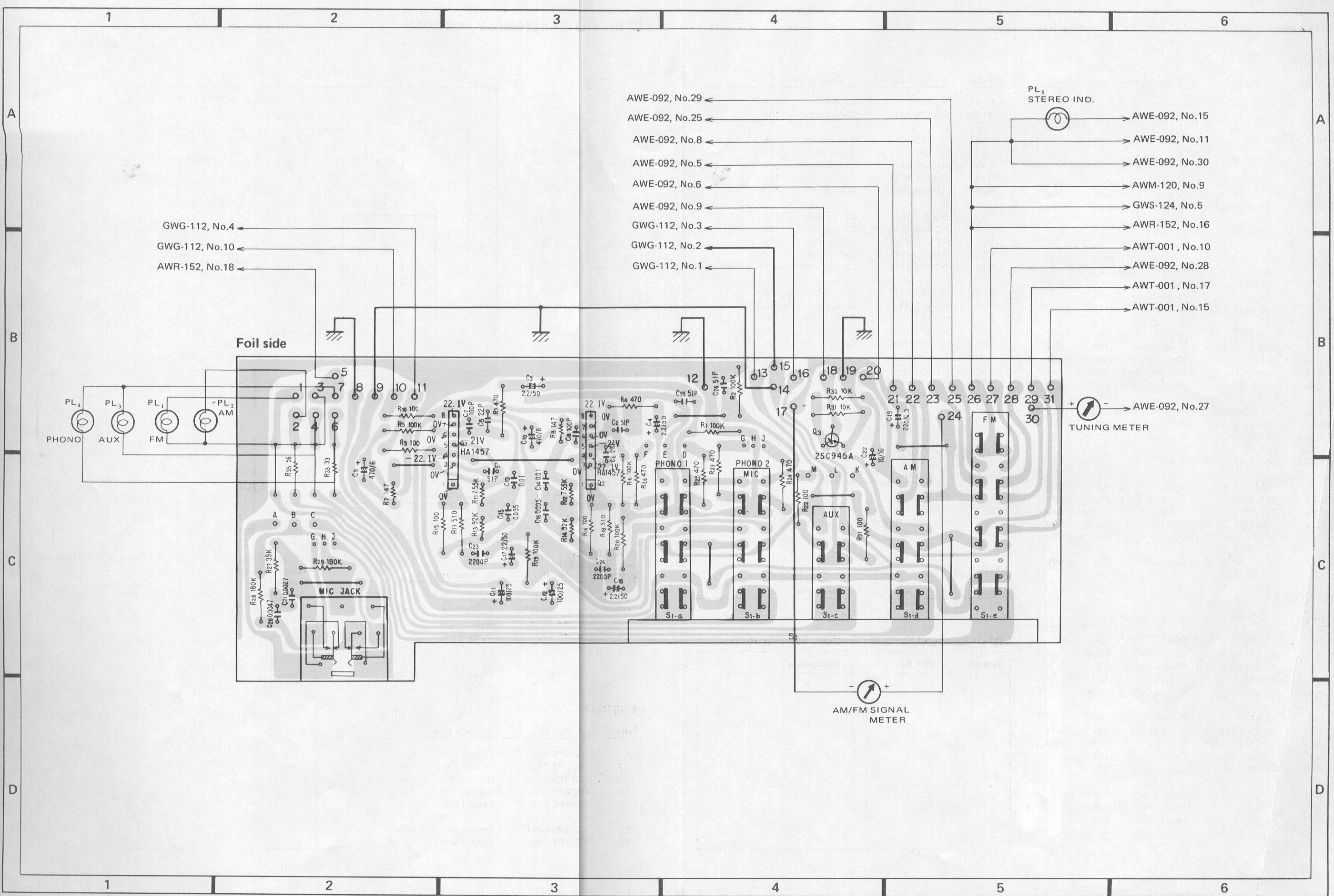

2 Lch
1 Rch
R1
150 (3W)
R2
150 (3W)
ON
OFF
R3
5.6K
D10
R4
470
D2
D1
R5
390
D3
D4
R6
200K
C1 4.7/6
Q1
-0.6V
R8
1.5K
C2
33/10
R7
30K
8
VR1
470
L
7
R
6
R9
5.6K
D11
R10
470
R11
390
D7
D6
D5
D8
R12
200K
C3 4.7/6
Q2
-0.6V
R13 30K
R14
1.5K
C4 33/10
VR2
470
D9
C5
100/6
R15
2.2K
SP-B
SP-A
C
D
A
B
5
13V
4
GND
3 -13V
Q1,Q2 2SC1919 x2
D1~D11 1S2473 x11


1
2
3
A
B
C
D
Foil side
HEADPHONES JACK
D1 1S2473
D2 1S2473
D3 1S2473
D4 1S2473
D10 1S2473
R1 150 (3W)
R2 150 (3W)
R4 470
R5 390
R3 5.6K
C1 4.7/6
C3 4.7/6
R6 200K
13V
Q1 2SC1919
-0.6V
Q2 2SC1919
13V
-0.6V
R7 30K
R13 30K
R8 1.5K
C2 33/10
C4 33/10
R14 1.5K
C5 100/6
POWER METER L ch
R ch
VR1 470
VR2 470
8
7
6
5
4
3
2
1
D
C
B
A
R15 2.2K
D9 1S2473
R9 5.6K
SP A
SP B
R12 200K
D8
D5
D6
D11
1S2473×4
D7 1S2473
R11 390
R10 470
AWE-092, No.11
AWM-120, No.9
GWS-!25, No.26
AWE-092, No.30
AWR-152, No.16
AWE-092, No.15
PL5 STEREO INDICATOR
AWR-152, No.28
AWM-120, No.6
GWS-128, No. A
GWS-128, No. B
GWS-128, No. C
AWM-120, No.7
GWS-128, No. D

12.9 FUNCTION EQUALIZER ASSEMBLY (GWS-125)



1
2
3
A
B
C
D
8 E
4 AUX
PHONO 2
PHONO 1
5 7.5V
6
FM
3
2 AM
R33 33
R35 56
S1-c
S1-b
S1-a
S1-e
S1-d
S1
Q3 2SC945A
OUT
L R E
16 13 14 15
12 E
R22 100
R21 100
R24 470
R23 470
R25 470
R26 470
C29 220 6.3
C27 10 16
R30 10K
R31 15K
18
29
31
19
E
17
21
20
22
24
23
30
25
26
27
28
Q1 HA1457
Q2 HA1457
R11 510
C17 22/50
R15 100
C23 0.002
R13 92K
C15 0.035
R11 5.55K
C13 0.01
R20 100K
C18 22 50
R18 510
C24 0.002
R19 100K
R16 100
R14 92K
C16 0.035
R12 5.55K
C14 0.01
C11 100 25×2
C12
C9 470/6
C10 470 6
R7 147
R8 147
C7 100P
C8 100P
22.1V
-22.1V
0V
-2N
-21V
C5 22P
C6 22P
R5 100K
R6 100K
C3 22 50
C1 51P
C2 51P
C4 22/50
R3 470
R4 470
R1 100K
R2 100K
C25 51P
C26 51P
R9 100
R10 100
C21 0.0047
C20 0.0047
R32 180K
R27 39K
R28 82K
-23V
23V
K
D
J
E
B
11
9
10
F
A
M
C


Foil side
AWE-092, No.29
AWE-092, No.25
AWE-092, No.8
AWE-092, No.5
AWE-092, No.6
AWE-092, No.9
GWG-112, No.3
GWG-112, No.2
GWG-112, No.1
GWG-112, No.4
GWG-112, No.10
AWR-152, No.18
PL5 STEREO IND.
AWE-092, No.15
AWE-092, No.11
AWE-092, No.30
AWM-120, No.9
GWS-124, No.5
AWR-152, No.16
AWT-001, No.10
AWE-092, No.28
AWT-001, No.17
AWT-001, No.15
AWE-092, No.27
TUNING METER
AM/FM SIGNAL METER
PL4 PHONO
PL3 AUX
PL1 FM
PL2 AM
HA1457
2SC945A
Q1
Q2
Q3
MIC JACK
PHONO 1
PHONO 2
MIC
AUX
AM
FM
S1-a
S1-b
S1-c
S1-d
S1-e
S1
22.1V
21V
-22.1V
0V
R35 56
R33 33
R10 100
R5 100K
R9 100
R3 470
R7 147
R11 755K
R17 510
R13 92K
R15 100
R8 147
R12 755K
R14 92K
R16 100
R18 510
R19 100K
R20 100K
R4 470
R1 100K
R2 100K
R6 100K
R26 470
R25 470
R23 470
R24 470
R22 100
R21 100
R30 10K
R31 10K
R29 180K
R27 39K
R28 180K
C3 2.2/50
C7 100P
C5 22P
C9 470/6
C10 470/6
C8 100P
C2 51P
C6 22P
C4 2.2/50
C1 51P
C13 0.01
C14 0.01
C15 0.035
C16 0.035
C17 22/50
C23 2200P
C24 2200P
C18 2.2/50
C11 100/25
C12 100/25
C25 51P
C26 51P
C19 220/6.3
C22 10/16
C21 0.0027
C20 0.0047
A B C
D E F
G H J
K L M
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
1 2 3 4 5 6
A B C D

Parts List of Function and Equalizer Assembly (GWS-125)

SWITCH

Symbol	Part No.	Description
S1	ASG-126	Push switch

CAPACITORS

Symbol	Part No.	Description		
C1	CCDSL 510J 50	Ceramic	51p	50V
C2	CCDSL 510J 50	Ceramic	51p	50V
C3	CEANL 2R2P 50	Electrolytic	2.2	50V
C4	CEANL 2R2P 50	Electrolytic	2.2	50V
C5	CCDSL 220K 50	Ceramic	22p	50V
C6	CCDSL 220K 50	Ceramic	22p	50V
C7	CCDSL 101K 50	Ceramic	100p	50V
C8	CCDSL 101K 50	Ceramic	100p	50V
C9	CEA 471P 6	Electrolytic	470	6V
C10	CEA 471P 6	Electrolytic	470	6V
C11	CEA 101P 25	Electrolytic	100	25V
C12	CEA 101P 25	Electrolytic	100	25V
C13	CQPA 103G 50	Polypropylene	0.01	50V
C14	CQPA 103G 50	Polypropylene	0.01	50V
C15	CQPA 353G 50	Polypropylene	0.035	50V
C16	CQPA 353G 50	Polypropylene	0.035	50V
C17	CEANL 2R2P 50	Electrolytic	2.2	50V
C18	CEANL 2R2P 50	Electrolytic	2.2	50V
C19	CEA 221K 6.3	Electrolytic	220	6.3V
C20	CQMA 472K 50	Mylar	0.0047	50V
C21	CQMA 272K 50	Mylar	0.0027	50V
C22	CEA 100P 16	Electrolytic	10	16V
C23	CKDYF 222Z 50	Ceramic	2200p	50V
C24	CKDYF 222Z 50	Ceramic	2200p	50V
C25	CCDSL 510J 50	Ceramic	51p	50V
C26	CCDSL 510J 50	Ceramic	51p	50V

RESISTORS

Symbol	Part No.	Description		
R1	RD¼PS 104J	Carbon film	100k	
R2	RD¼PS 104J	Carbon film	100k	
R3	RD¼PS 471J	Carbon film	470	
R4	RD¼PS 471J	Carbon film	470	
R5	RD¼PS 104J	Carbon film	100k	
R6	RD¼PS 104J	Carbon film	100k	
R7	RN⅕ SQ 1470F	Metal film	147	⅕W
R8	RN⅕ SQ 1470F	Metal film	147	⅕W
R9	RD¼PS 101J	Carbon film	100	
R10	RD¼PS 101J	Carbon film	100	
R11	ACN-011	Metal film	7.55k	
R12	ACN-011	Metal film	7.55k	
R13	ACN-012	Metal film	92k	
R14	ACN-012	Metal film	92k	
R15	RD¼PS 101J	Carbon film	100	
R16	RD¼PS 101J	Carbon film	100	
R17	RD¼PS 511J	Carbon film	510	
R18	RD¼PS 511J	Carbon film	510	
R19	RD¼PS 104J	Carbon film	100k	
R20	RD¼PS 104J	Carbon film	100k	
R21	RD¼PS 101J	Carbon film	100	
R22	RD¼PS 101J	Carbon film	100	
R23	RD¼PS 471J	Carbon film	470	
R24	RD¼PS 471J	Carbon film	470	
R25	RD¼PS 471J	Carbon film	470	
R26	RD¼PS 471J	Carbon film	470	
R27	RD¼PS 393J	Carbon film	39k	
R28	RD¼PS 184J	Carbon film	180k	
R29	RD¼PS 184J	Carbon film	180k	
R30	RD¼PS 103J	Carbon film	10k	
R31	RD¼PS 103J	Carbon film	10k	
R32	....	....		
R33	RD¼PS 330J	Carbon film	33	
R34	....	....		
R35	RD¼PS 560J	Carbon film	56	

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	HA 1457	IC
Q2	HA 1457	IC
Q3	2SC945A-Q or R (2SC1914-F)	Transistor

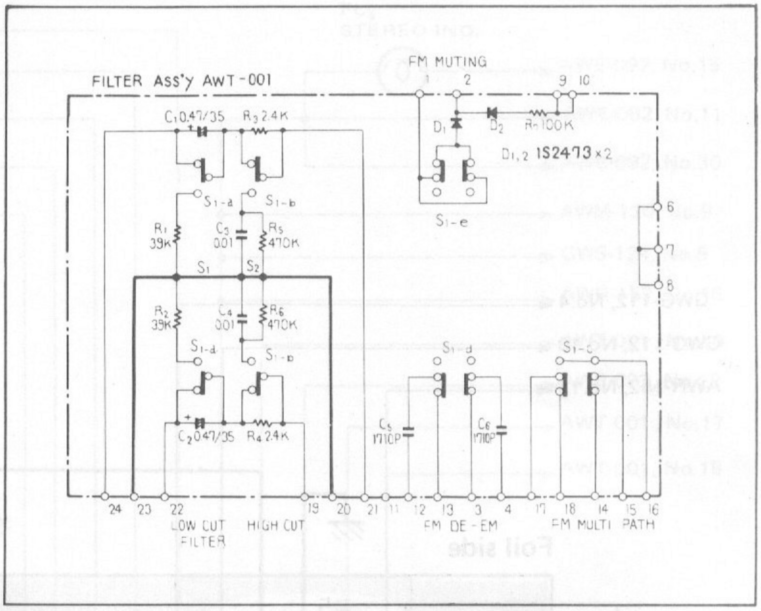
OTHER

Symbol	Part No.	Description
	AKN-012	Mic jack

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

12.10 FILTER ASSEMBLY (AWT-001)



FILTER Ass'y AWT-001
FM MUTING
1
2
9
10
C1 0.47/35
R3 2.4K
D1
D2
R7 100K
D1, 2 1S2473 ×2
S1-a
S1-b
S1-e
R1 39K
C3 0.01
R5 470K
S1
S2
R2 39K
C4 0.01
R6 470K
S1-d
S1-b
S1-d
S1-c
6
7
8
C2 0.47/35
R4 2.4K
C5 1710P
C6 1710P
24
23
22
19
20
21
11
12
13
3
4
17
18
14
15
16
LOW CUT FILTER
HIGH CUT
FM DE-EM
FM MULTI PATH

Part List

SWITCH

Symbol	Part No.	Description
S1	ASG-128	Push switch

CAPACITORS

Symbol	Part No.	Description		
C1	CSZA R47M 35	Electrolytic	0.47	35V
C2	CSZA R47M 35	Electrolytic	0.47	35V
C3	CQMA 103K 50	Mylar	0.01	50V
C4	CQMA 103K 50	Mylar	0.01	50V
C5	ACE-043	Styrol	1710p	50V
C6	ACE-043	Styrol	1710p	50V

RESISTORS

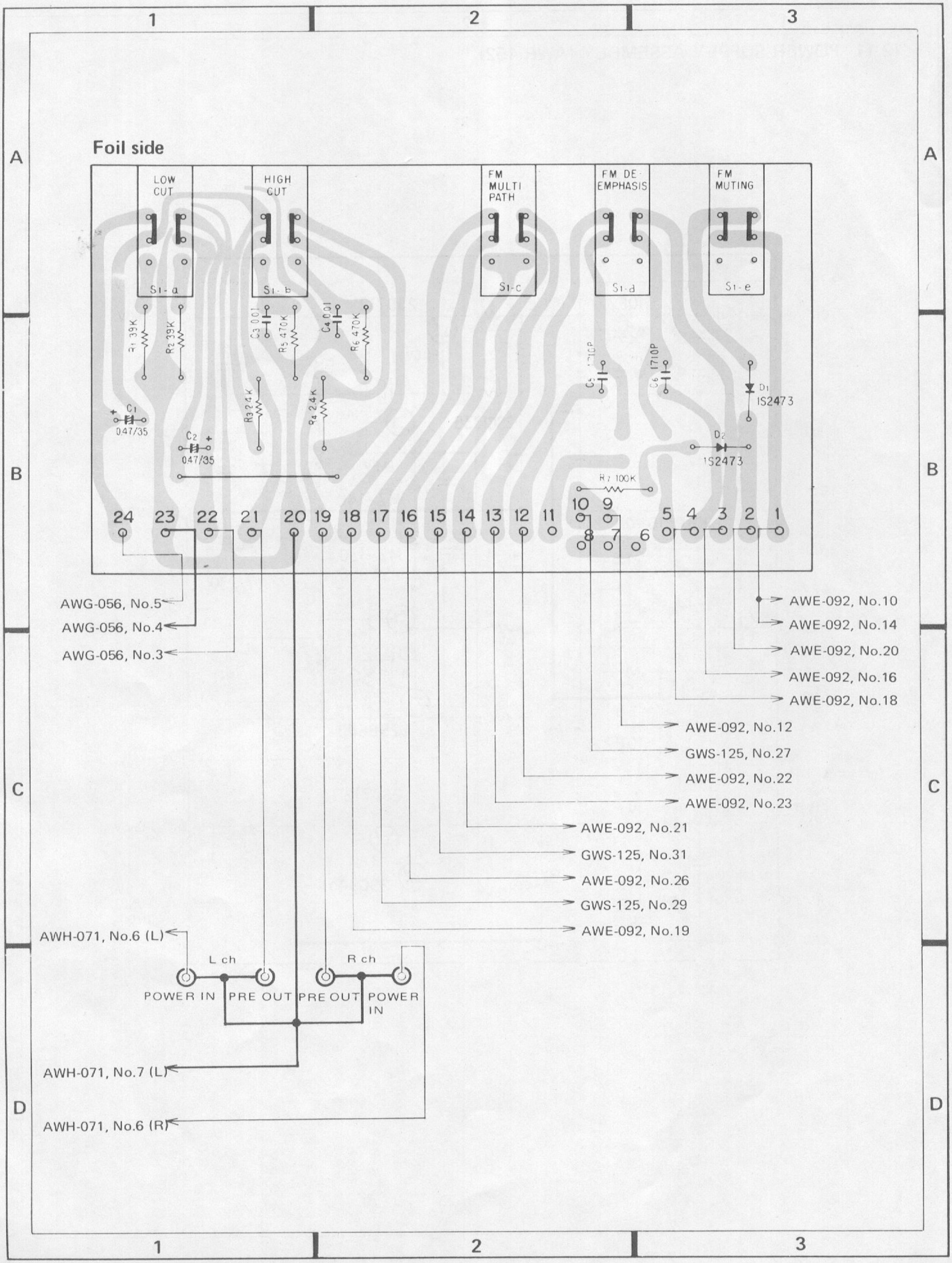
Symbol	Part No.	Description	
R1	RD¼PS 393J	Carbon film	39k
R2	RD¼PS 393J	Carbon film	39k
R3	RD¼PS 242J	Carbon film	2.4k
R4	RD¼PS 242J	Carbon film	2.4k
R5	RD¼PS 474J	Carbon film	470k
R6	RD¼PS 474J	Carbon film	470k
R7	RD¼PS 104J	Carbon film	100k

SEMICONDUCTORS

Symbol	Part No.	Description
D1	1S2473 or 1S1555	Diode
D2	1S2473 or 1S1555	Diode

List of Changed Parts for Factory Modification

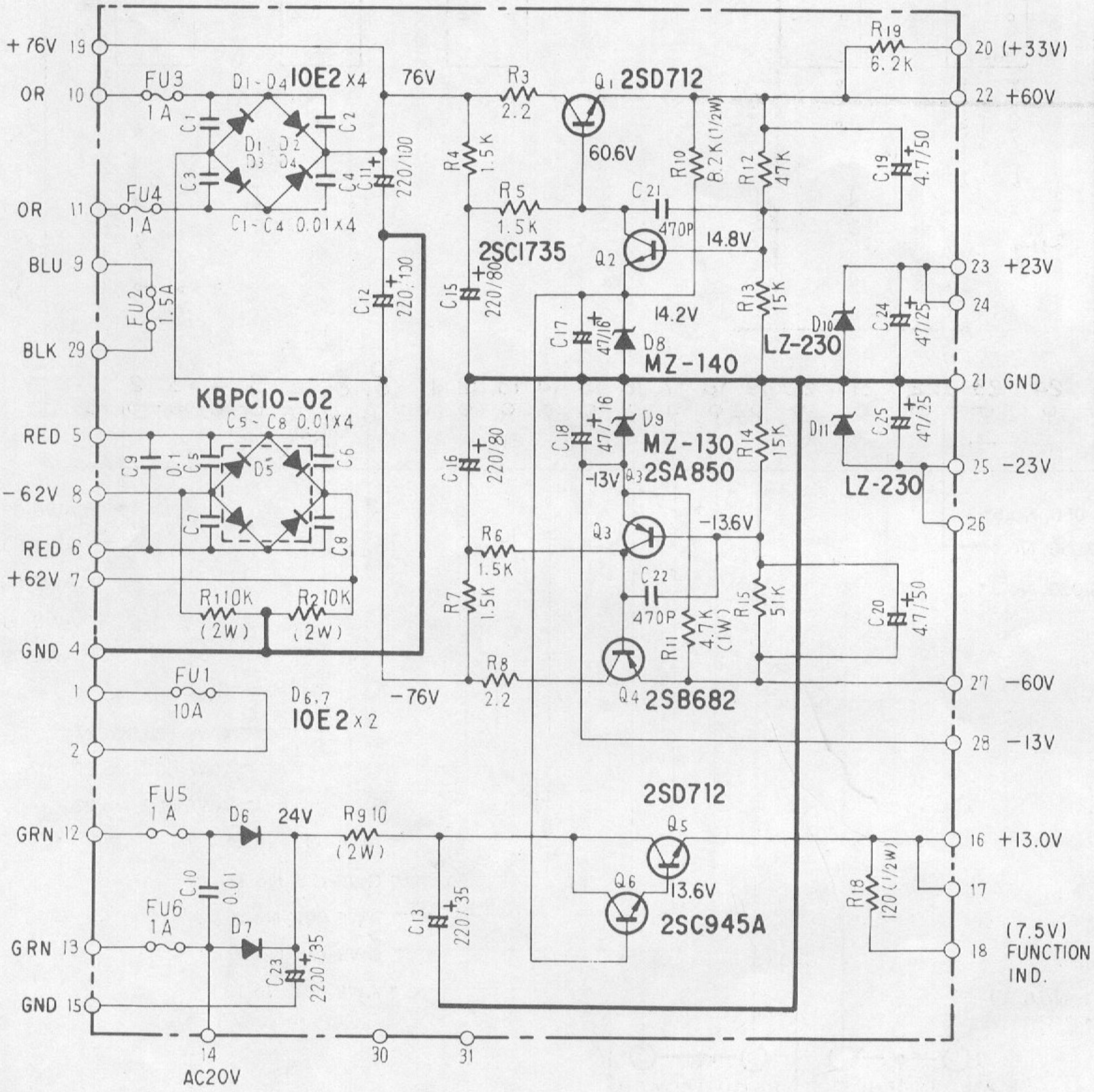
Symbol	Part No.	Description

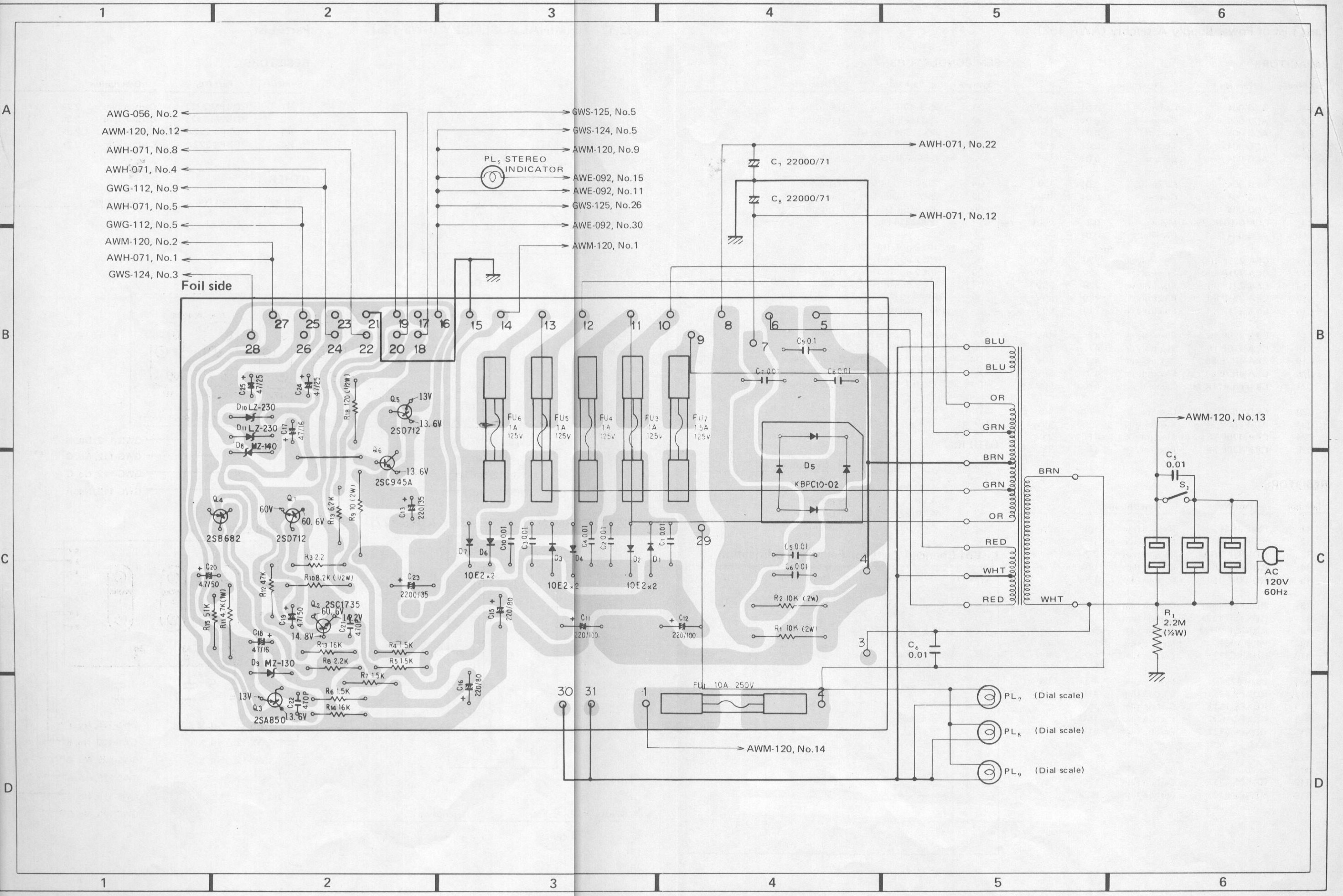


Foil side

1
2
3
A
B
C
D
LOW CUT
HIGH CUT
FM MULTI PATH
FM DE-EMPHASIS
FM MUTING
S1-a
S1-b
S1-c
S1-d
S1-e
R1 39K
R2 39K
C3 0.01
R5 470K
C4 0.01
R6 470K
R3 2.4K
R4 2.4K
C1 0.47/35
C2 0.47/35
C5 1710P
C6 1710P
D1 1S2473
D2 1S2473
R7 100K
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
AWG-056, No.5
AWG-056, No.4
AWG-056, No.3
AWE-092, No.10
AWE-092, No.14
AWE-092, No.20
AWE-092, No.16
AWE-092, No.18
AWE-092, No.12
GWS-125, No.27
AWE-092, No.22
AWE-092, No.23
AWE-092, No.21
GWS-125, No.31
AWE-092, No.26
GWS-125, No.29
AWE-092, No.19
AWH-071, No.6 (L)
L ch
R ch
POWER IN
PRE OUT
PRE OUT
POWER IN
AWH-071, No.7 (L)
AWH-071, No.6 (R)

12.11 POWER SUPPLY ASSEMBLY (AWR-152)


+76V 19
OR 10
FU3 1A
D1~D4 10E2×4
C1 C2 C3 C4
D1 D2 D3 D4
C11 220/100
76V
OR 11
FU4 1A
C1~C4 0.01×4
BLU 9
FU2 1.5A
BLK 29
C12 220/100
KBPC10-02
C5~C8 0.01×4
RED 5
C9 0.1
C5 C6 C7 C8
D5
-62V 8
RED 6
+62V 7
R1 10K (2W)
R2 10K (2W)
GND 4
FU1 10A
1
2
D6,7 10E2×2
-76V
GRN 12
FU5 1A
D6
24V
R9 10 (2W)
C10 0.01
FU6 1A
GRN 13
D7
C23 2200/35
GND 15
14 AC20V
30
31
R3 2.2
Q1 2SD712
60.6V
R4 1.5K
R5 1.5K
C21 470P
Q2 2SC1735
14.8V
C15 220/80
C17 47/16
D8 MZ-140
14.2V
C18 47/16
D9 MZ-130
C16 220/80
-13V
Q3 2SA850
-13.6V
R6 1.5K
R7 1.5K
C22 470P
R11 4.7K (1W)
Q4 2SB682
R8 2.2
C13 220/35
2SD712
Q5
Q6
13.6V
2SC945A
R10 8.2K (1/2W)
R12 47K
R13 15K
R14 15K
R15 51K
R19 6.2K
C19 4.7/50
D10 LZ-230
C24 47/25
D11
C25 47/25
LZ-230
C20 4.7/50
R18 120 (1/2W)
20 (+33V)
22 +60V
23 +23V
24
21 GND
25 -23V
26
27 -60V
28 -13V
16 +13.0V
17
18 (7.5V) FUNCTION IND.


AWG-056, No.2
AWM-120, No.12
AWH-071, No.8
AWH-071, No.4
GWG-112, No.9
AWH-071, No.5
GWG-112, No.5
AWM-120, No.2
AWH-071, No.1
GWS-124, No.3
Foil side
GWS-125, No.5
GWS-124, No.5
AWM-120, No.9
PL5 STEREO INDICATOR
AWE-092, No.15
AWE-092, No.11
GWS-125, No.26
AWE-092, No.30
AWM-120, No.1
AWH-071, No.22
C7 22000/71
C8 22000/71
AWH-071, No.12
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
C25 47/25
C24 47/25
R18 120 (1/2W)
Q5 13V
13.6V
2SD712
D10 LZ-230
D11 LZ-230
D8 MZ-140
C17 47/16
Q6
13.6V
2SC945A
Q4
2SB682
Q1 60V
60.6V
2SD712
R19 6.7K
R9 10 (2W)
C13 220/35
C20 4.7/50
R3 2.2
R10 8.2K (1/2W)
R12 47K
C23 2200/35
R15 51K
R11 4.7K (1W)
Q2 2SC1735
60.6V
C19 4.7/50
14.2V
C21 4.7/50
14.8V
C18 47/16
R13 16K
R8 2.2K
R4 1.5K
R5 1.5K
R7 1.5K
D9 MZ-130
13V
Q3
2SA850
C22 470P
13.6V
R6 1.5K
R14 16K
C15 220/80
C16 220/80
FU6 1A 125V
FU5 1A 125V
FU4 1A 125V
FU3 1A 125V
FU2 1.5A 125V
C9 0.01
C7 0.01
C8 0.01
D5
KBPC10-02
D7
D6
C10 0.01
C3 0.01
D3
D4
C4 0.01
C2 0.01
D2
D1
C1 0.01
10E2×2
10E2×2
10E2×2
29
C5 0.01
C6 0.01
4
R2 10K (2W)
R1 10K (2W)
C11 220/100
C12 220/100
3
C6 0.01
30
31
1
FU1 10A 250V
2
AWM-120, No.14
BLU
BLU
OR
GRN
BRN
GRN
OR
RED
WHT
RED
BRN
WHT
AWM-120, No.13
C5 0.01
S1
AC 120V 60Hz
R1 2.2M (½W)
PL7 (Dial scale)
PL8 (Dial scale)
PL9 (Dial scale)
1
2
3
4
5
6
A
B
C
D

Parts List of Power Supply Assembly (AWR-152)

CAPACITORS

Symbol	Part No.	Description		
C1	ACG-004	Ceramic	0.01	150V
C2	ACG-004	Ceramic	0.01	150V
C3	ACG-004	Ceramic	0.01	150V
C4	ACG-004	Ceramic	0.01	150V
C5	ACG-004	Ceramic	0.01	150V
C6	ACG-004	Ceramic	0.01	150V
C7	ACG-004	Ceramic	0.01	150V
C8	ACG-004	Ceramic	0.01	150V
C9	CQMA 104K 250	Mylar	0.1	250V
C10	ACG-004	Ceramic	0.01	
C11	CEA 221P 100	Electrolytic	220	100V
C12	CEA 221P 100	Electrolytic	220	100V
C13	CEA 221P 35	Electrolytic	220	35V
C15	CEA 221P 80	Electrolytic	220	80V
C16	CEA 221P 80	Electrolytic	220	80V
C17	CEA 470P 16	Electrolytic	47	16V
C18	CEA 470P 16	Electrolytic	47	16V
C19	CEA 4R7P 50	Electrolytic	4.7	50V
C20	CEA 4R7P 50	Electrolytic	4.7	50V
C21	CKDYB 471K 50	Ceramic	470p	50V
C22	CKDYB 471K 50	Ceramic	479p	50V
C23	ACH-060	Electrolytic	2200	35V
C24	CEA 470P 25	Electrolytic	47	25V
C25	CEA 470P 25	Electrolytic	47	25V

RESISTORS

Symbol	Part No.	Description		
R1	PS2P 103J	Metal oxide	10k	2W
R2	PS2P 103J	Metal oxide	10k	2W
R3	RD¼PSF 2R2J	Carbon film	2.2	
R4	RD¼PSF 152J	Carbon film	1.5k	
R5	RD¼PSF 152J	Carbon film	1.5k	
R6	RD¼PSF 152J	Carbon film	1.5k	
R7	RD¼PSF 152J	Carbon film	1.5k	
R8	RD¼PSF 2R2J	Carbon film	2.2	
R9	PS2P 100J	Metal oxide	10	2W
R10	RD½PS 822J	Carbon film	8.2k	½W
R11	PS1P 472J	Metal oxide	4.7k	1W
R12	RD¼PS 473J	Carbon film	47k	
R13	RD¼PS 153J	Carbon film	15k	
R14	RD¼PS 153J	Carbon film	15k	
R15	RD¼PS 513J	Carbon film	51k	
R16				
R17				
R18	RD½PS 121J	Carbon film	120	½W
R19	RD¼PS 622J	Carbon film	6.2k	

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SD712-D or C	Transistor
Q2	2SC1735-D or C (2SC1384-Q or R)	Transistor
Q3	2SA850-D or C (2SA684A-Q or R)	Transistor
Q4	2SB682-D or C	Transistor
Q5	2SD712-D or C	Transistor
Q6	2SC945A-Q or R (2SC1914-F)	Transistor
D1	10E2 or SIB01-02	Diode
D2	10E2 or SIB01-02	Diode
D3	10E2 or SIB01-02	Diode
D4	10E2 or SIB01-02	Diode
D5	KBPC10-02 (S15VB20)	Diode
D6	10E2 or SIB01-02	Diode
D7	10E2 or SIB01-02	Diode
D8	MZ140 or WZ-140	Zener diode
D9	MZ130 or WZ-130	Zener diode
D10	LZ230	Zener diode
D11	LZ230	Zener diode

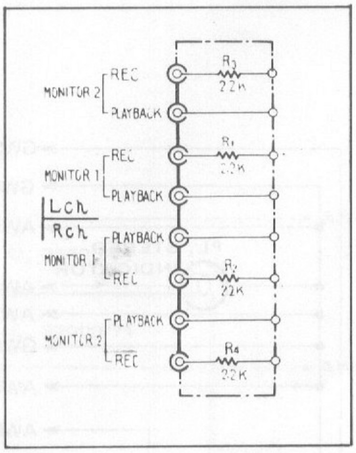
OTHERS

Symbol	Part No.	Description
	ANH-395	Heat sink
	ANH-203	Heat sink
	AKR-013	Fuse holder
	AKR-030	Fuse holder

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

12.12 TERMINAL ASSEMBLY (GWS-126)


MONITOR 2
REC
PLAYBACK
R3 2.2K
MONITOR 1
REC
PLAYBACK
R1 2.2K
Lch
Rch
PLAYBACK
MONITOR 1
REC
R2 2.2K
PLAYBACK
MONITOR 2
REC
R4 2.2K

Parts List

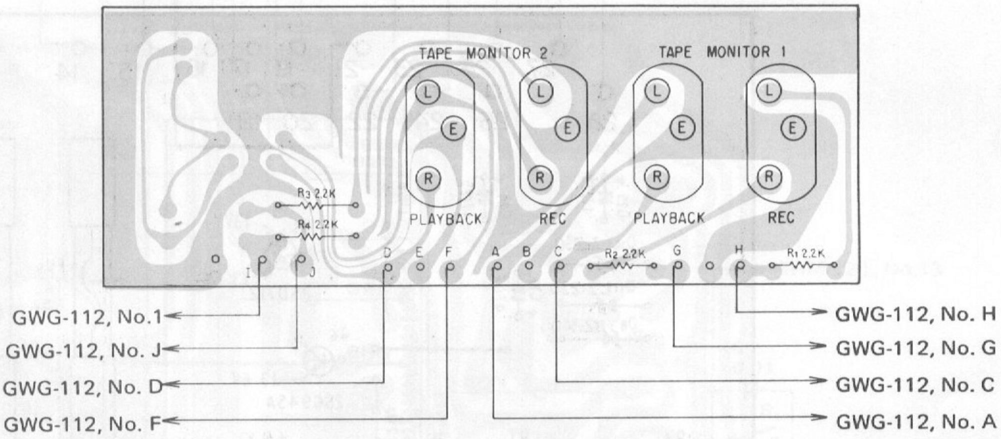
RESISTORS

Symbol	Part No.	Description	
R1	RD¼PM 222J	Carbon film	2.2k
R2	RD¼PM 222J	Carbon film	2.2k
R3	RD¼PS 222J	Carbon film	2.2k
R4	RD¼PS 222J	Carbon film	2.2k

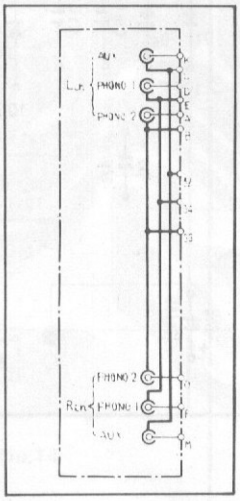
OTHER

Symbol	Part No.	Description
	AKB-027	4P pin jack

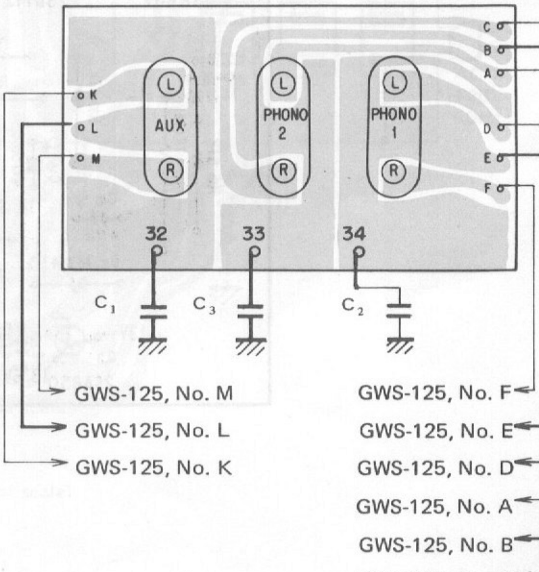
Foil side


TAPE MONITOR 2
TAPE MONITOR 1
L
E
R
PLAYBACK
REC
PLAYBACK
REC
R3 2.2K
R4 2.2K
I
J
D
E
F
A
B
C
R2 2.2K
G
H
R1 2.2K
GWG-112, No.1
GWG-112, No. J
GWG-112, No. D
GWG-112, No. F
GWG-112, No. H
GWG-112, No. G
GWG-112, No. C
GWG-112, No. A

12.13 TERMINAL ASSEMBLY (GWS-127)


AUX
Lch
PHONO 1
PHONO 2
PHONO 2
Rch
PHONO 1
AUX

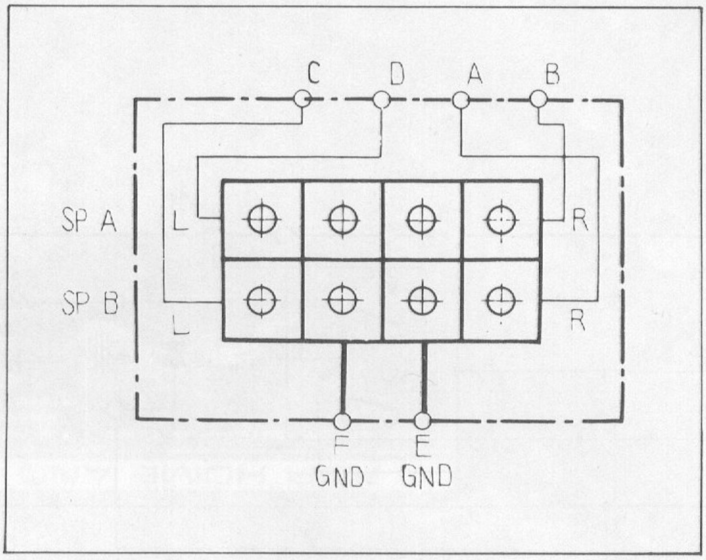
Foil side


C
B
A
K
L
M
AUX
PHONO 2
PHONO 1
L
R
D
E
F
32
33
34
C1
C3
C2
GWS-125, No. M
GWS-125, No. L
GWS-125, No. K
GWS-125, No. F
GWS-125, No. E
GWS-125, No. D
GWS-125, No. A
GWS-125, No. B
GWS-125, No. C

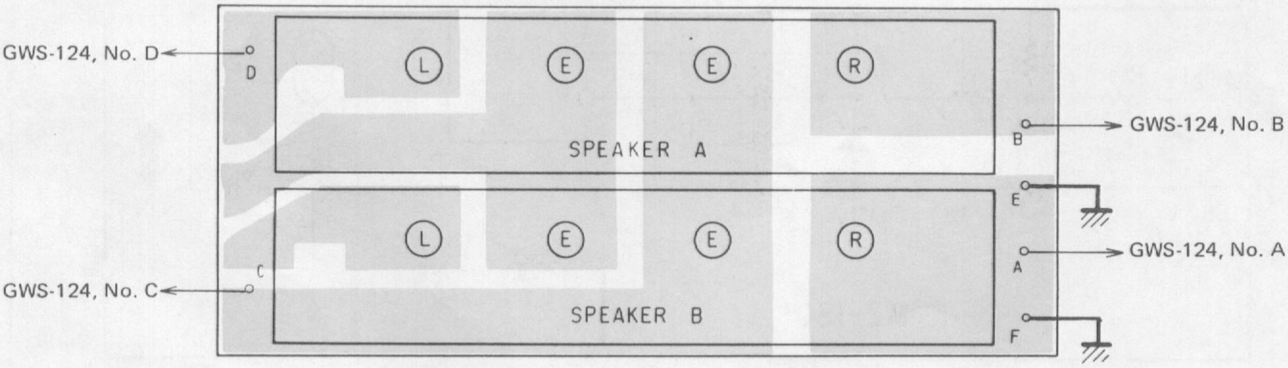
Part List

Symbol	Part No.	Description
	AKB-028	6-P pinJack

12.14 SPEAKER TERMINAL ASSEMBLY (GWS-128)


C
D
A
B
SP A
L
R
SP B
L
R
F
GND
E
GND

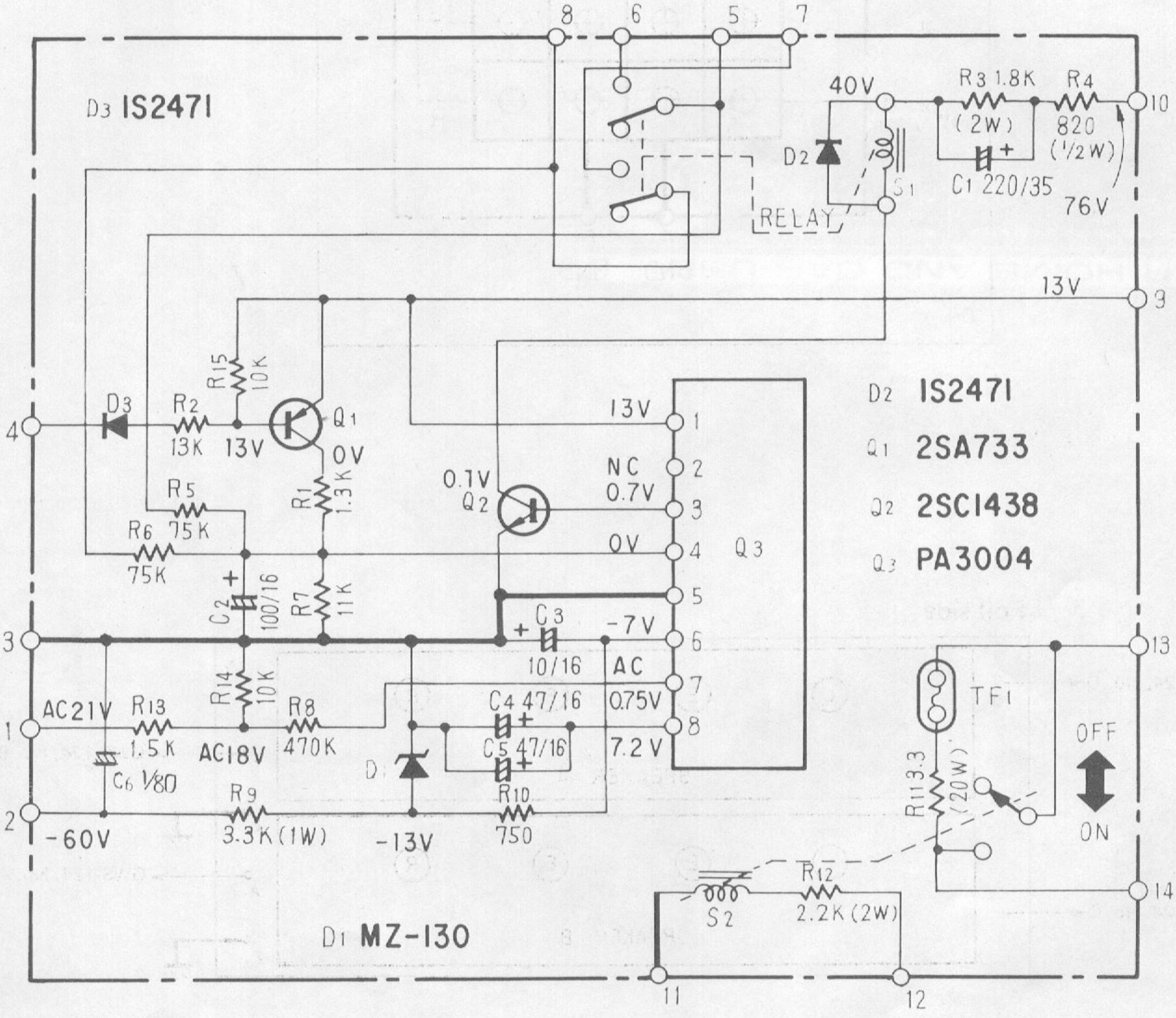
Foil side


GWS-124, No. D
D
L
E
E
R
SPEAKER A
B
GWS-124, No. B
E
L
E
E
R
A
GWS-124, No. A
C
GWS-124, No. C
SPEAKER B
F

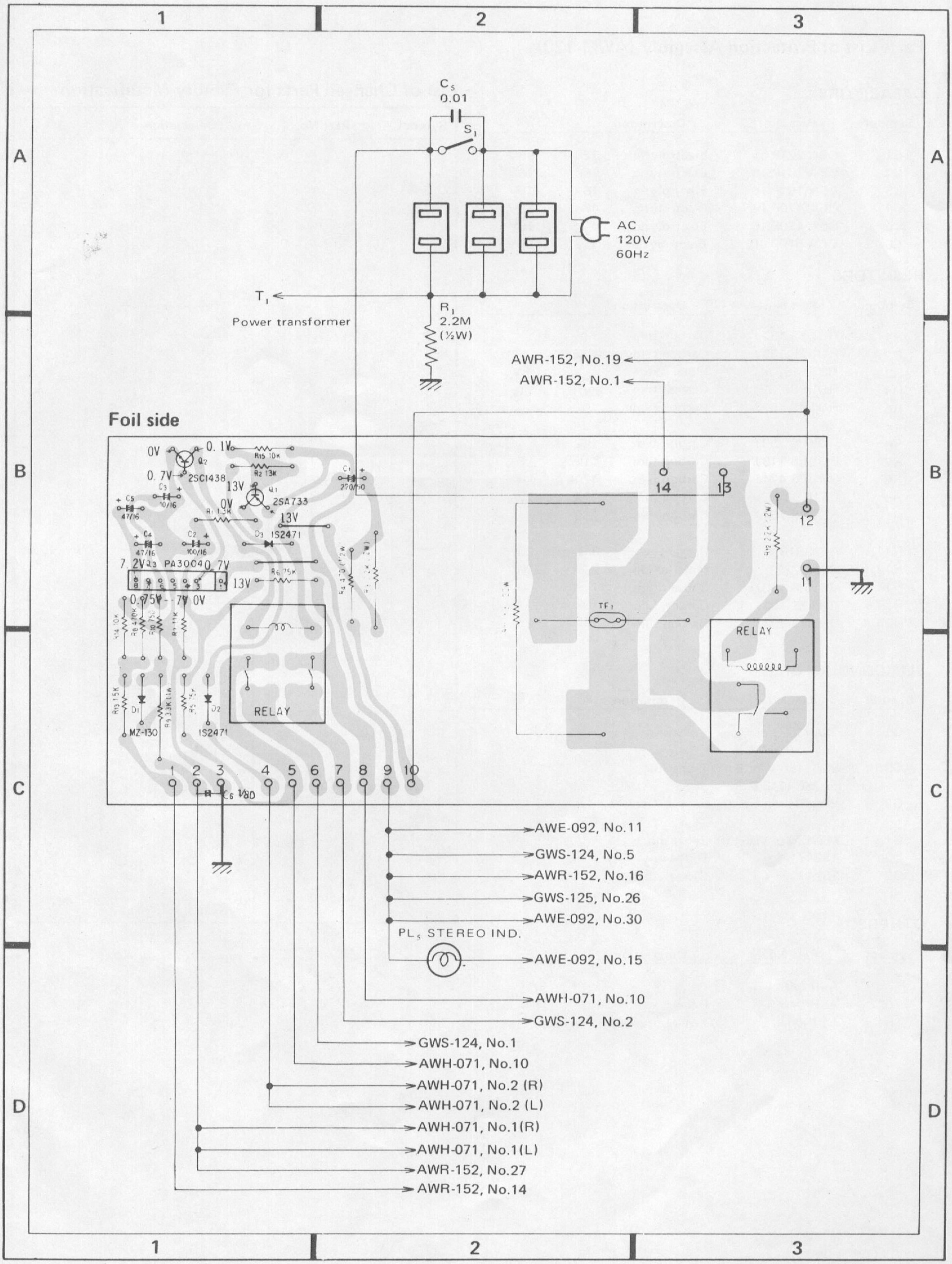
Parts List

Symbol	Part No.	Description
	AKE-029	Push terminal C

12.15 PROTECTION ASSEMBLY (AWM-120)



D3 IS2471
D2 IS2471
Q1 2SA733
Q2 2SC1438
Q3 PA3004
D1 MZ-130
8
6
5
7
40V
R3 1.8K
(2W)
R4
820
(1/2W)
C1 220/35
76V
10
D2
S1
RELAY
13V
9
4
D3
R2
13K
R15
10K
13V
Q1
0V
R1
1.3K
R5
75K
R6
75K
0.1V
Q2
13V
1
NC
2
0.7V
3
0V
4
Q3
5
-7V
6
AC
7
0.75V
8
7.2V
C2
100/16
R7
11K
C3
10/16
3
1
AC21V
R13
1.5K
C6 1/80
R14
10K
AC18V
R8
470K
C4 47/16
C5 47/16
D1
2
-60V
R9
3.3K (1W)
-13V
R10
750
13
TF1
R11 3.3
(20W)
OFF
ON
14
S2
R12
2.2K (2W)
11
12


1
2
3
A
B
C
D
C5
0.01
S1
AC
120V
60Hz
T1
Power transformer
R1
2.2M
(½W)
AWR-152, No.19
AWR-152, No.1
Foil side
0V
0.1V
Q2
2SC1438
0.7V
R15 10K
R2 13K
C3
10/16
13V
Q1
2SA733
C5
47/16
0V
R1 1.3K
13V
C1
220/50
C4
47/16
C2
100/16
D3
1S2471
7.2V
Q3
PA3004
0.7V
R6 75K
13V
0.75V
-7V
0V
R14 10K
R8 470K
R10 750
R7 11K
R13 15K
D1
R9 33K
R5
D2
MZ-130
1S2471
RELAY
14
13
12
11
TF1
R12 22K (2W)
RELAY
1
2
3
4
5
6
7
8
9
10
C6 1/80
AWE-092, No.11
GWS-124, No.5
AWR-152, No.16
GWS-125, No.26
AWE-092, No.30
PL5 STEREO IND.
AWE-092, No.15
AWH-071, No.10
GWS-124, No.2
GWS-124, No.1
AWH-071, No.10
AWH-071, No.2 (R)
AWH-071, No.2 (L)
AWH-071, No.1(R)
AWH-071, No.1(L)
AWR-152, No.27
AWR-152, No.14

Parts List of Protection Assembly (AWM-120)

CAPACITORS

Symbol	Part No.	Description		
C1	CEA 221P 35	Electrolytic	220	35V
C2	CEA 101P 16	Electrolytic	100	16V
C3	CEA 100P 16	Electrolytic	10	16V
C4	CEA 470P 16	Electrolytic	47	16V
C5	CEA 470P 16	Electrolytic	47	16V
C6	CEA 010P 80	Electrolytic	1	80V

RESISTORS

Symbol	Part No.	Description		
R1	RD¼PS 132J	Carbon film	1.3k	
R2	RD¼PS 133J	Carbon film	13k	
R3	RS2P 182J	Metal oxide	1.8k	2W
R4	RD½PSF 821J	Carbon film	820	½W
R5	RD¼PS 753J	Carbon film	75k	
R6	RD¼PS 753J	Carbon film	75k	
R7	RD¼PS 113J	Carbon film	11k	
R8	RD¼PS 474J	Carbon film	470k	
R9	RS1P 332J	Carbon film	3.3k	1W
R10	RD¼PS 751J	Carbon film	750	
R11	ACN-019	Cement	3.3	20W
R12	RS2P 222J	Metal oxide	2.2k	2W
R13	RD¼PS 152J	Carbon film	1.5k	
R14	RD¼PS 103J	Carbon film	10k	
R15	RD¼PS 103J	Carbon film	10k	

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SA733-Q or R or 2SA904A-E or F	Transistor
Q2	2SC1438-V or B or 2SC1915-E or F	Transistor
Q3	PA3004	IC
D1	MZ-130 or WZ-130	Zener diode
D2	1S2471	Diode
D3	1S2471	Diode

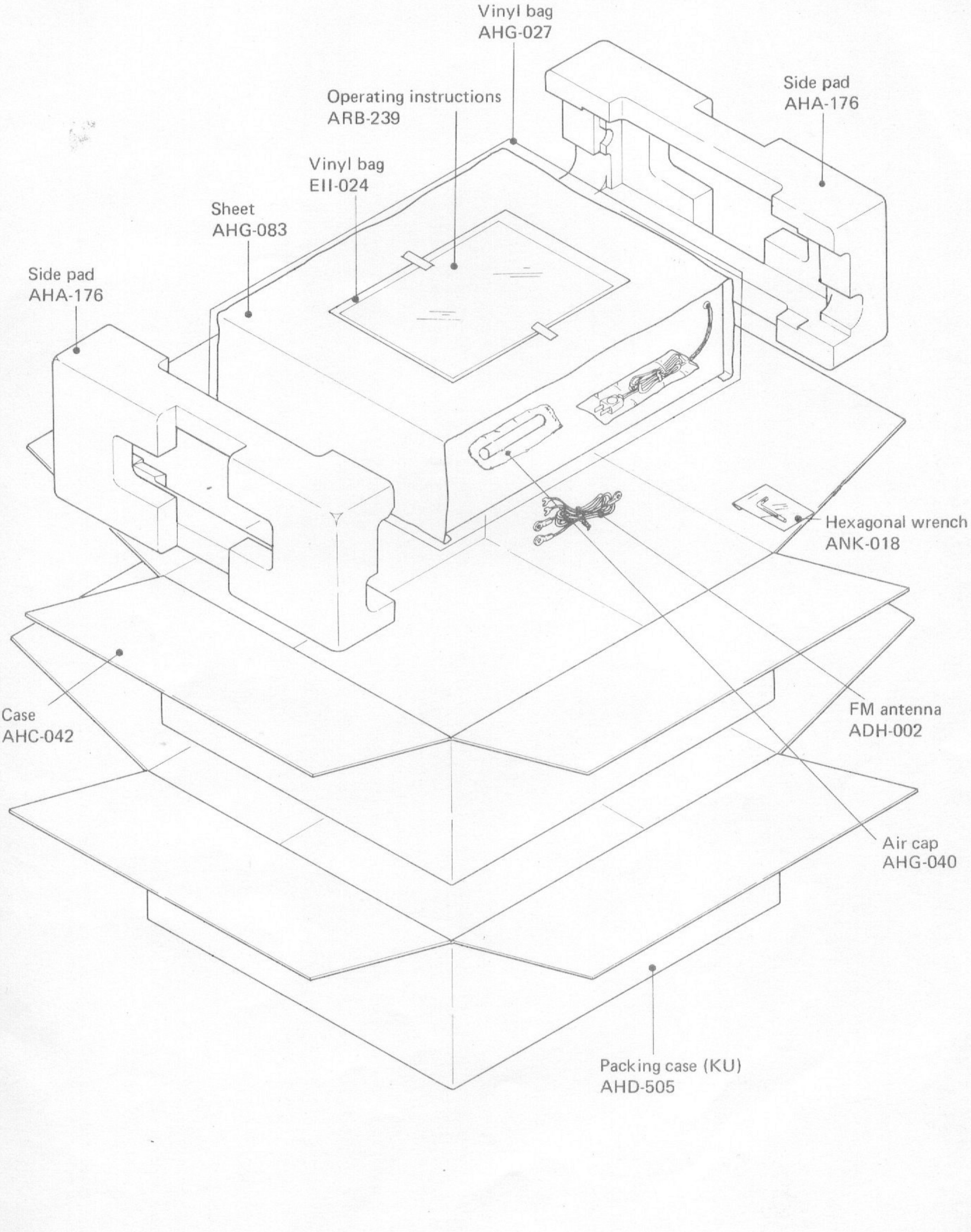
OTHERS

Symbol	Part No.	Description
	ASR-048	Relay
	ASR-046	Relay
TF1	AEX-001	Temperature-sensitive fuse

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

13. PACKING


Vinyl bag
AHG-027
Side pad
AHA-176
Operating instructions
ARB-239
Vinyl bag
EII-024
Sheet
AHG-083
Side pad
AHA-176
Hexagonal wrench
ANK-018
Case
AHC-042
FM antenna
ADH-002
Air cap
AHG-040
Packing case (KU)
AHD-505